

Why Organ Donation Rates in Canada are Changing

Sam D. Shemie

Transplant Atlantic, Halifax, Nov 10th 2015



**McGill University Health Centre,
Montreal Children's Hospital,
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Division of Critical Care



McGill University
Professor of Pediatrics

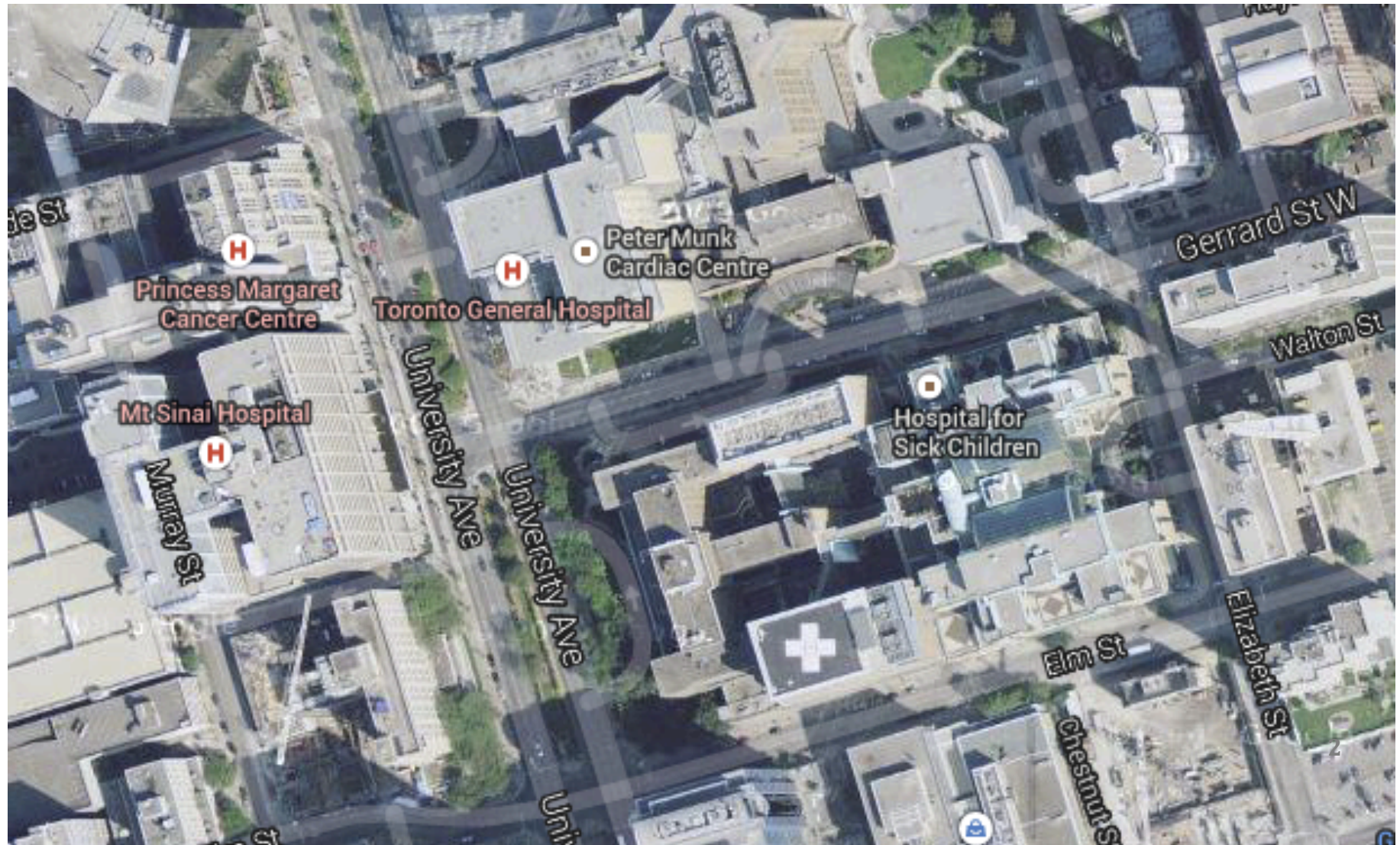


Canadian Blood Services
Medical Advisor, Deceased Donation



Background

Transplant Program Development = Organ Donation Needs



Saving Lives



Intensive Care

Transplanters

Pro-Con Debate
Toronto Critical Care Medicine Symposium 1999

Sam Shemie, Canada

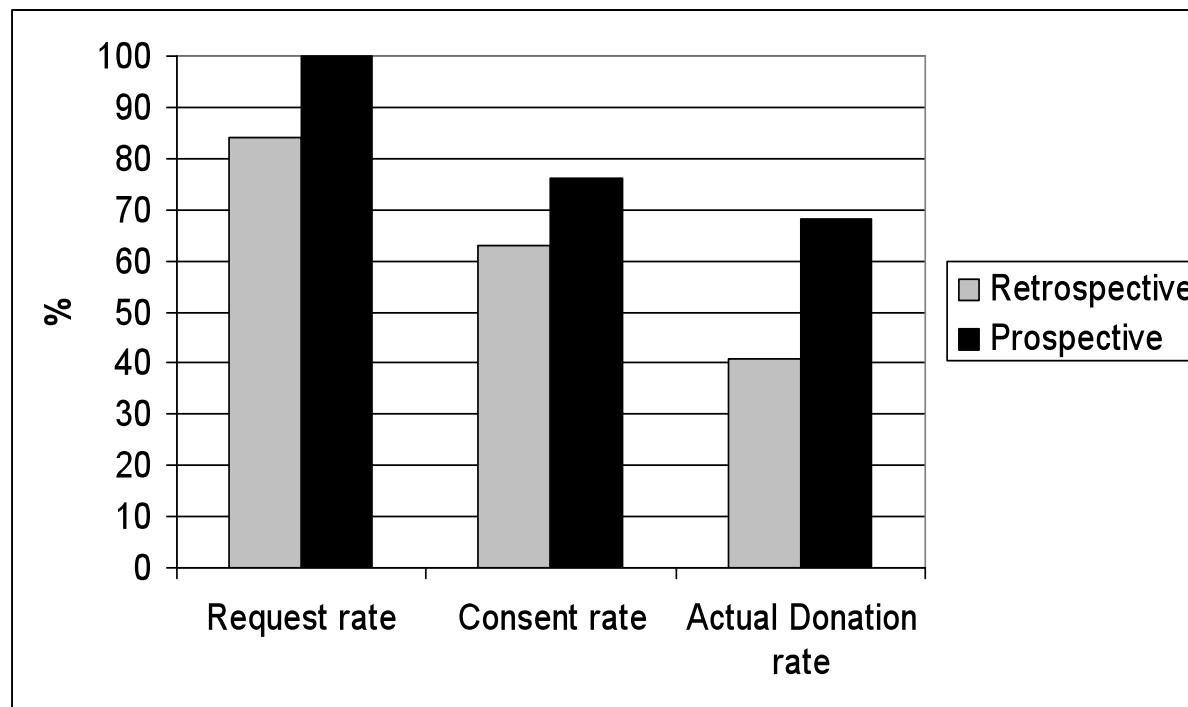
“ICU’s should take responsibility for organ donation”

Malcolm Fischer, Australia

“It’s not our fercucking problem”

Background

Impact of an ICU based organ donation team at HSC



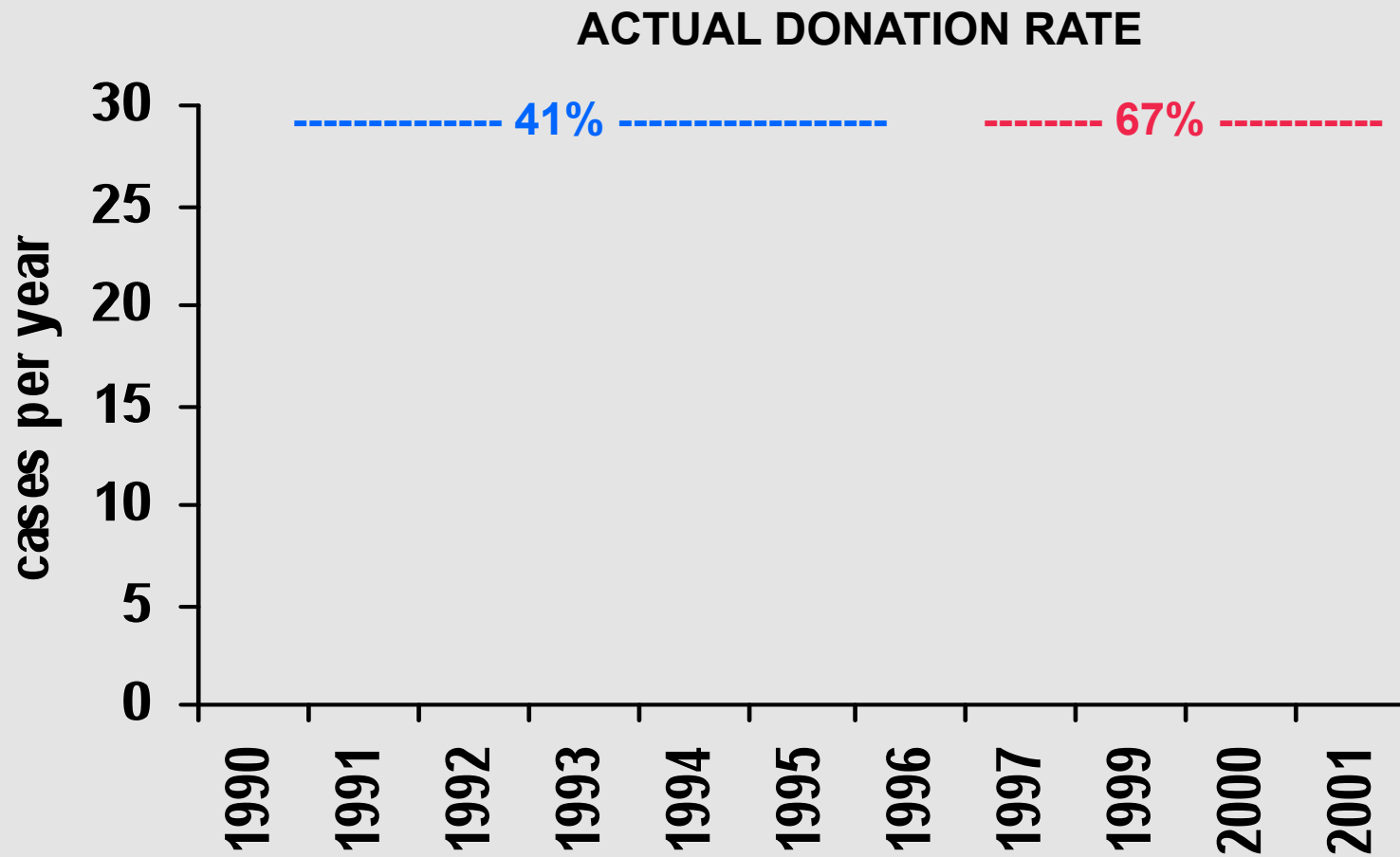
Retrospective (1990-1997): Informal commitment of staff

Prospective (1998-2002): 24x7 service, formal team of ICU physician, nurse coordinator, chaplaincy, social work

Background

Brain death eligible for organ donation

(Hospital for Sick Children, Toronto 1990-2002)



Challenges



Deceased Donation in Canada - 2012

1:144

Canadian Death Ratio

34,754,312

Canadian Population



Deceased Donation in Canada

542

Actual Donors

3,711

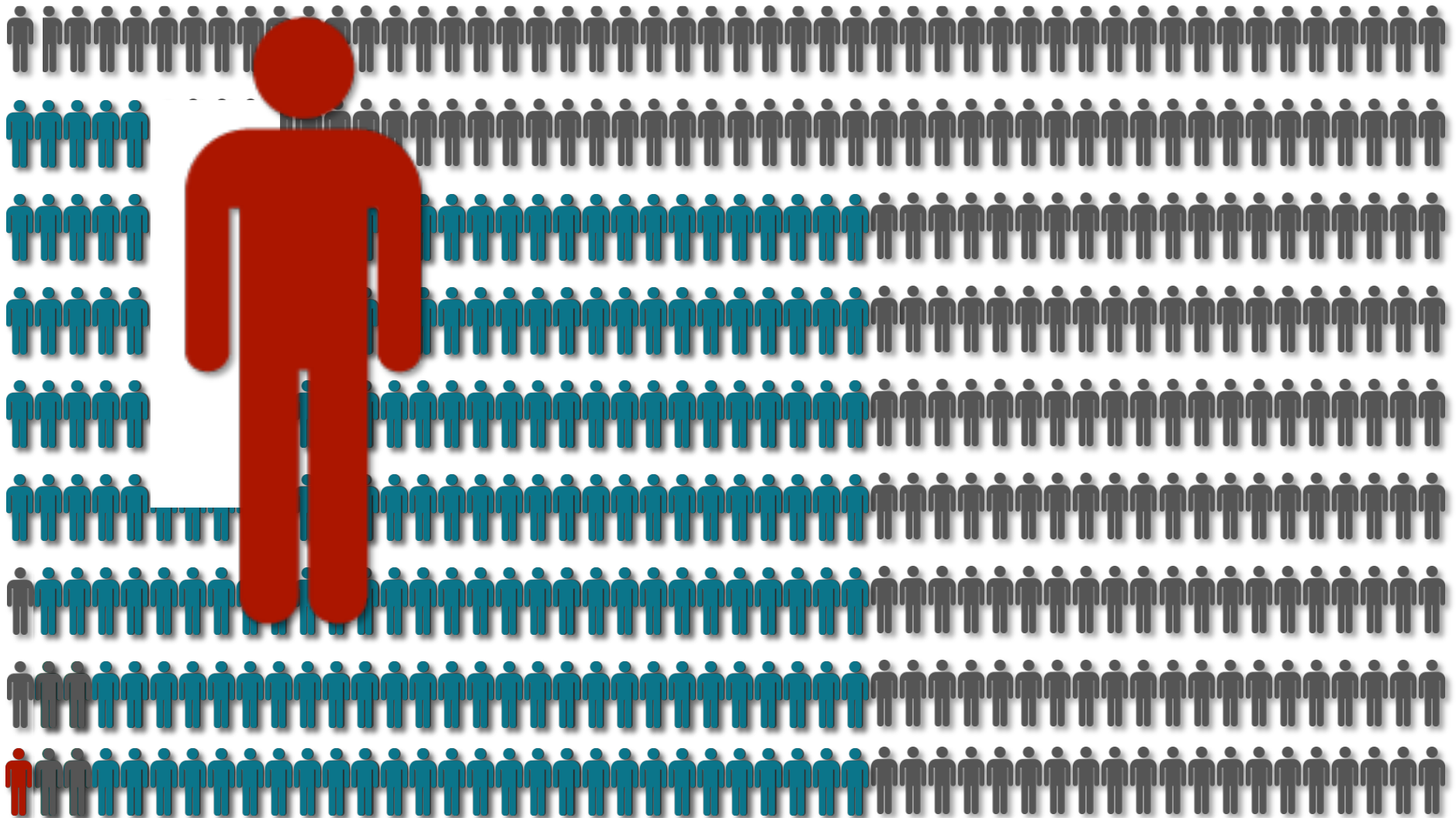
Potential Donors

117,156

Hospital Deaths

243,643

Deaths



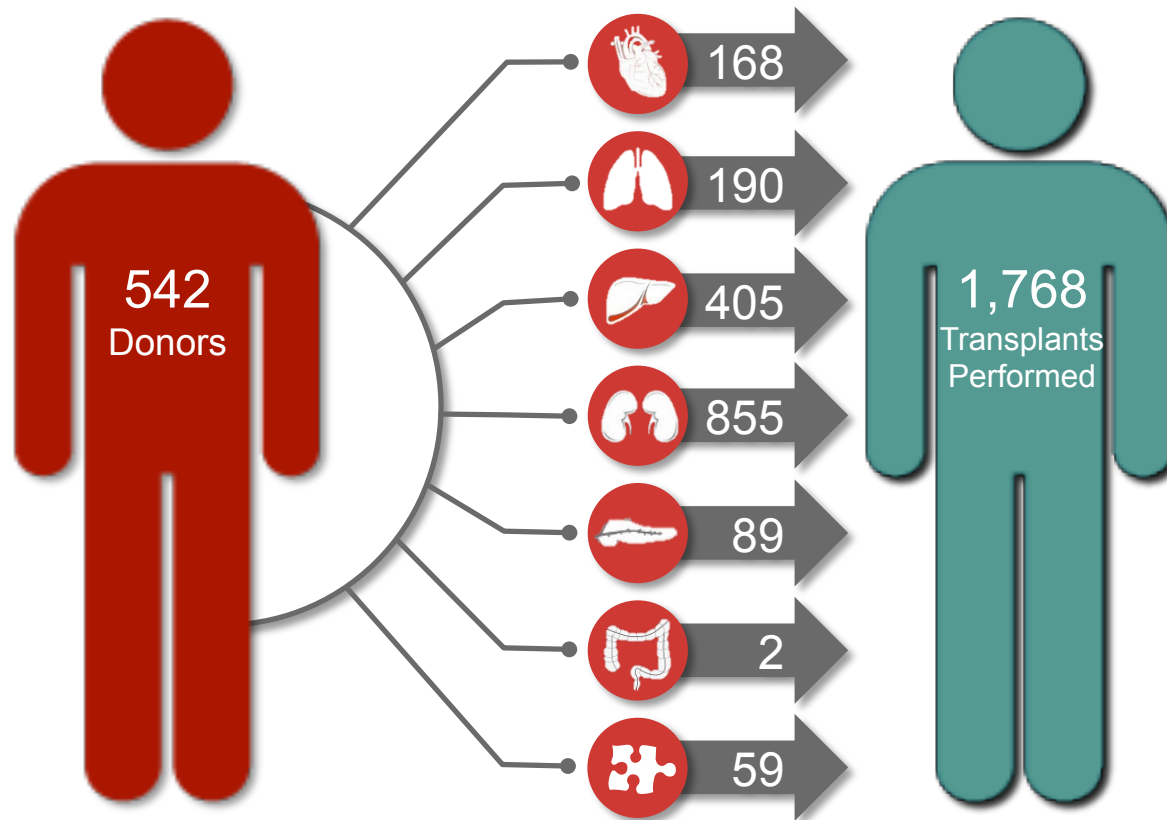
Deceased Donation in Canada

542
Actual Donors

3,711
Potential Donors

117,156
Hospital Deaths

243,643
Deaths



Challenges

Donation care is complex, difficult and emotionally straining

- Sensitive interplay between the deceased, their family and the medical profession – natural discomfort at the juncture where end-of-life and donation interface
- Donation is not a high profile concern for intensivists – there are no consequences for non-performance
- Physician workload and qualifications
- Hospital culture
- Donation occurs in low numbers in most hospitals

Challenges

Donation is dependent on where you die – which city, which hospital and where in the hospital

CMAJ RESEARCH

Organ donation after death in Ontario: a population-based cohort study

Donald A. Redelmeier MD, Frank Markel PhD, Damon C. Scales PhD

ABSTRACT

Background: Shortfalls in deceased organ donation lead to shortages of solid organs available for transplantation. We assessed rates of deceased organ donation and compared hospitals that had clinical services for transplant recipients (transplant hospitals) to those that did not (general hospitals).

Methods: We conducted a population-based cohort analysis involving patients who died from traumatic brain injury, subarachnoid hemorrhage, intracerebral hemorrhage or other catastrophic neurologic conditions in Ontario, Canada, between Apr. 1, 1994, and Mar. 31, 2011. We distinguished between acute care hospitals with and without transplant services. The primary outcome was actual organ donation determined through the physician database for organ procurement procedures.

Results: Overall, 87 129 patients died from catastrophic neurologic conditions during the study period, of whom 1930 became actual donors. Our primary analysis excluded

patients from small hospitals, reducing the total to 79 746 patients, of whom 1898 became actual donors. Patients who died in transplant hospitals had a distribution of demographic characteristics similar to that of patients who died in other large general hospitals. Transplant hospitals had an actual donor rate per 100 deaths that was about 4 times the donor rate at large general hospitals (5.0 v. 1.4, $p < 0.001$). The relative reduction in donations at general hospitals was accentuated among older patients, persisted among patients who were the most eligible candidates and amounted to about 121 fewer actual donors per year (adjusted odds ratio 0.58, 95% confidence interval 0.36–0.92). Hospital volumes were only weakly correlated with actual organ donation rates.

Interpretation: Optimizing organ donation requires greater attention to large general hospitals. These hospitals account for most of the potential donors and missed opportunities for deceased organ donation.

Competing interests: Donald Redelmeier, Frank Markel and Damon Scales have received grant funding from the Trillium Gift of Life Network. Frank Markel has served as president of the Trillium Gift of Life Network. No other competing interests were declared.

This article has been peer reviewed.

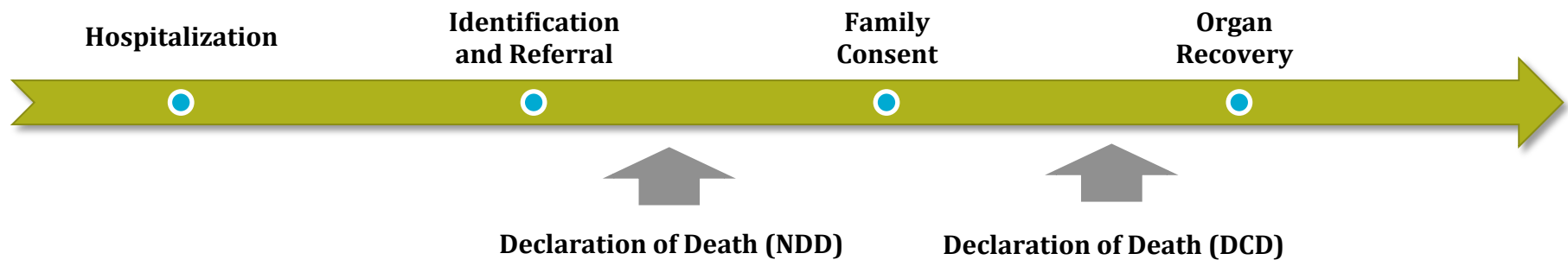
Correspondence to: Donald A. Redelmeier, dar@ices.on.ca

CMAJ 2013; DOI:10.1503/cmaj.122047

“Transplant hospitals had an actual donor rate per 100 deaths that was about 4 times the donor rate at large general hospitals”

Challenges

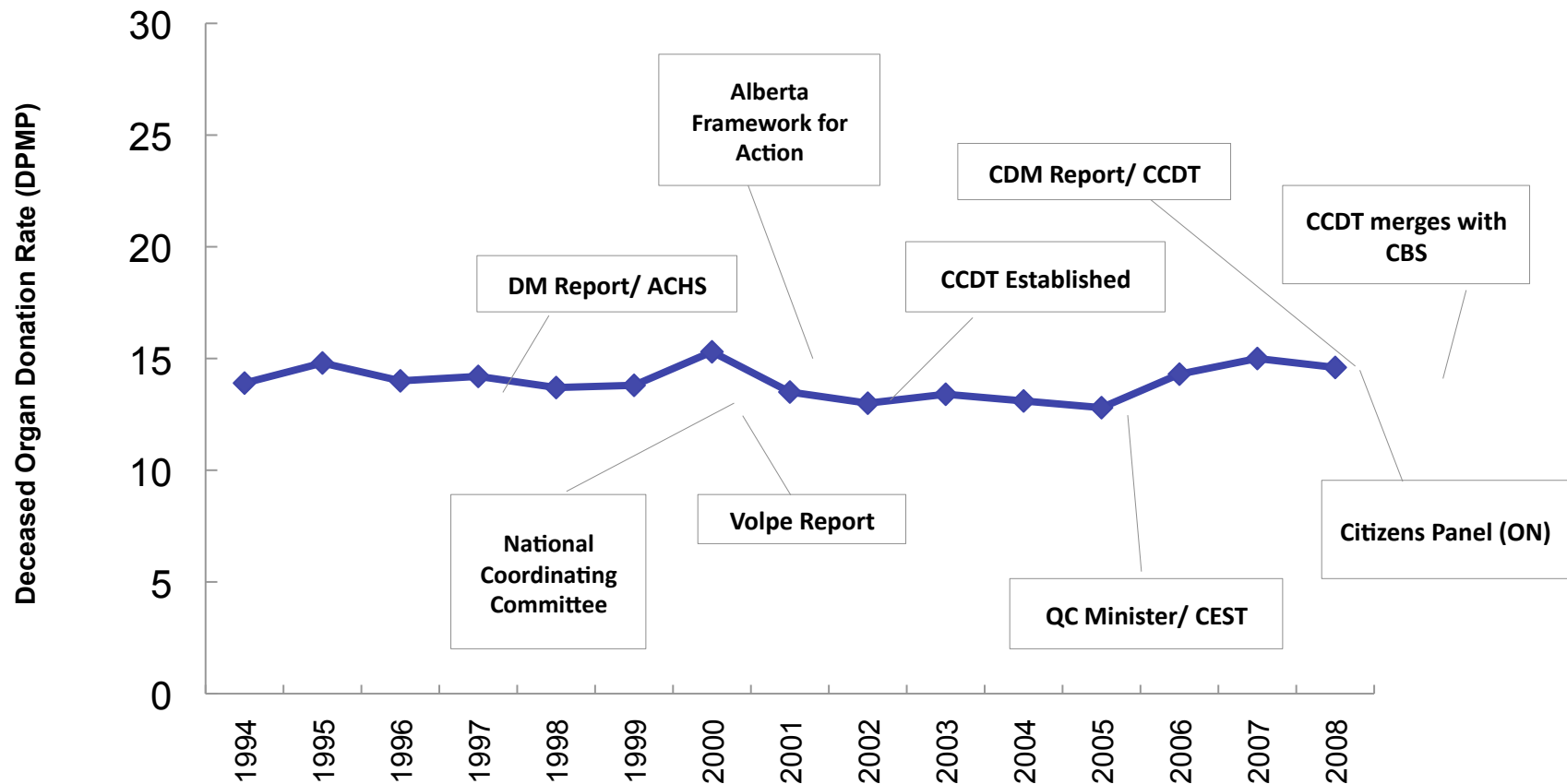
Many ways to miss the donation opportunity



- Hospital staff does not recognize a potential donor or notify ODO in a timely manner
- Hospitals do not know patient's wishes regarding donation
- Families are not asked about donation, or asked in a negative way
- Physicians are unaware of best practices for clinical management of donor, death determination procedures, NDD and DCD
- Hospital does not have a DCD program
- Access to surgical recovery teams

Challenges

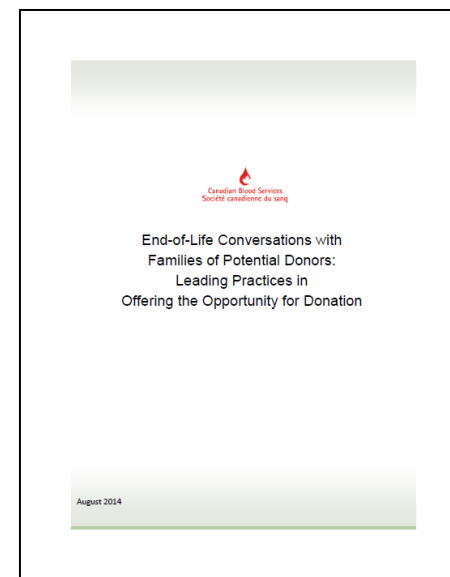
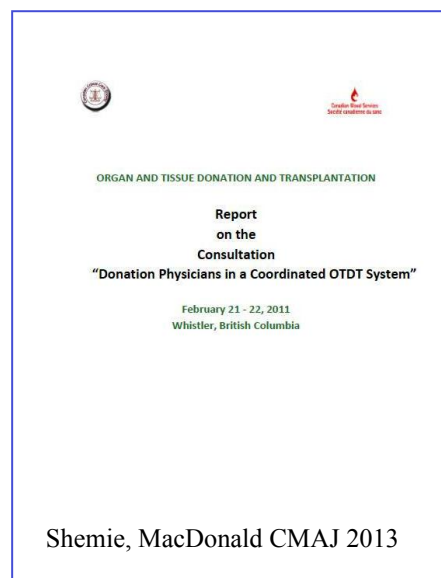
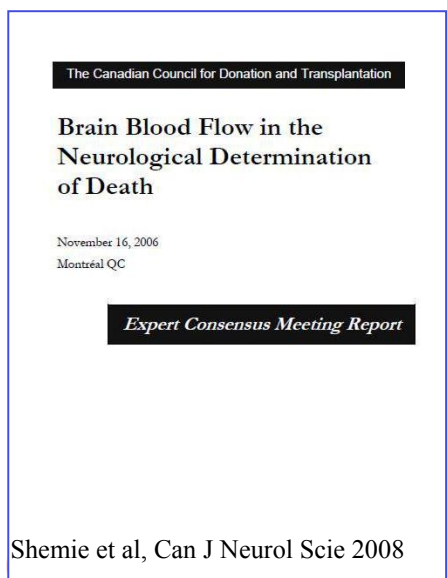
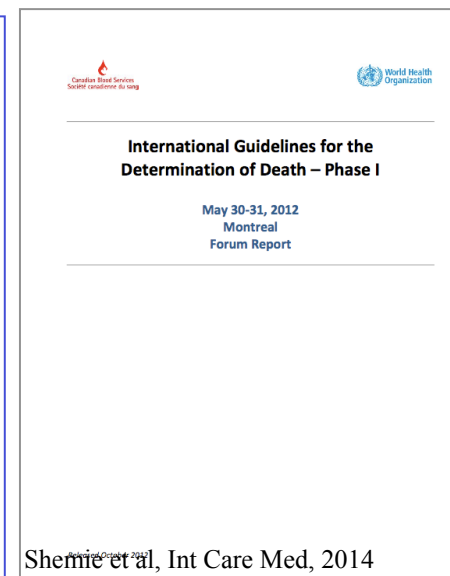
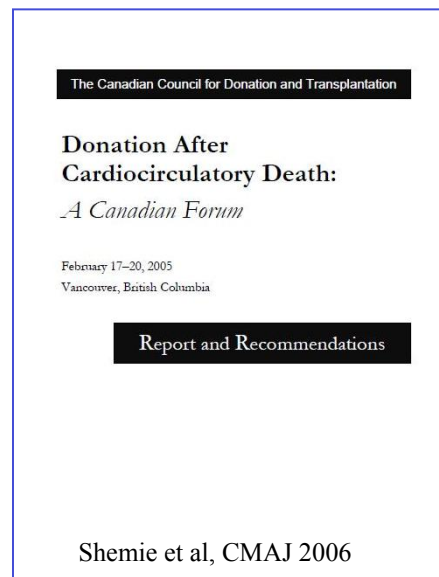
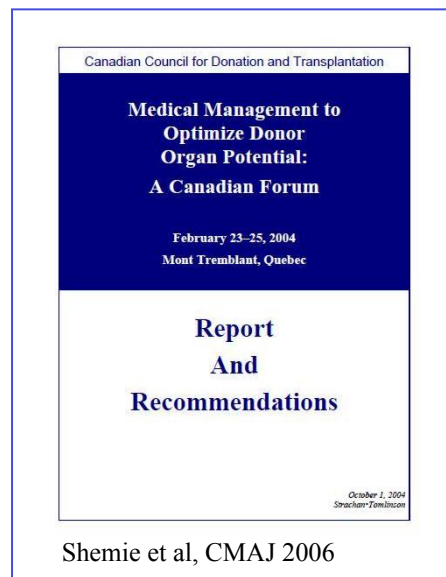
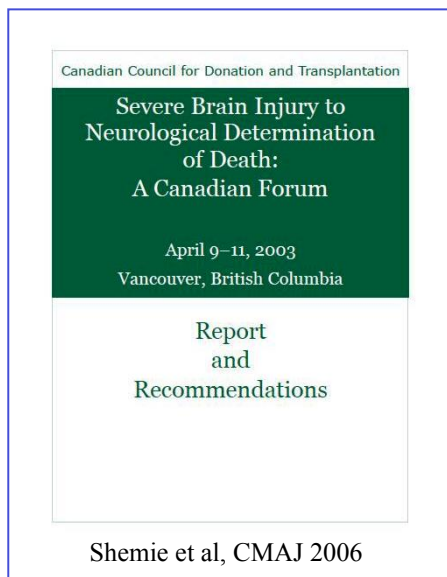
The need for re-design was recognized, but little improvement seen



Solutions



Canadian ICU based Deceased Donation Leading Practice Recommendations 2003-2015



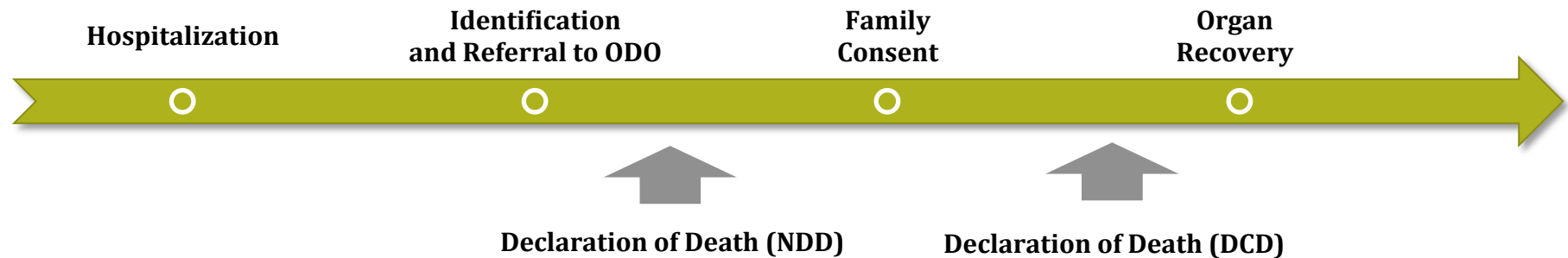
FINAL RECOMMENDATIONS



- 25 recommendations in total—13 for TDT and 12 for ODT
- Completed and sent to Federal, Provincial and Territorial Deputy Ministers of Health in April 2011

Solutions

Leading Practices Development



- ✓ Death Determination, NDD, DCD (2003, 2005, 2007, 2012)
- ✓ Donor Management (2004)
- ✓ Controlled DCD (2005)
- ✓ Donation Physician Specialists (2011, 2015)
- ✓ End-of-life Family Conversations/ Consent (2014)

- ❖ Pediatric DCD 2014-15 in progress
- ❖ Death Audits/Medical Record Review 2014-15 in progress
- ❑ Uncontrolled DCD

Solutions

Leading Practices Implementation and Uptake

- Donor management and NDD recommendations well incorporated into current provincial ODO guidelines
- Where DCD programs have been implemented, national leading practices have been incorporated.
- DCD has not been implemented in 5 of 10 provincial ODOs – opportunity for future increases in donation

TABLE 1: Summary of Canadian Organ Donation Organizations Deceased Donation Practice Guidelines

	Donor Management			NDD			DCD			Comments
	HG	YR	RR	HG	YR	RR	HG	YR	RR	
British Columbia Transplant	GL	2004	Yes	SOP	2007	Yes	GL	2010	Yes	
HOPE Northern Alberta	GL	<2004	Yes	GL	<2004	Yes	GL	2009	Yes	
Southern Alberta Organ and Tissue Donation	SOP	2009	Yes	SOP	2009	Yes	Not done	na	na	DCD working group in place
Saskatchewan Transplant	StO	2006	Yes	SOP	(1989)	Yes	Not done	na	na	Interested but needs ICU MD champion
Transplant Manitoba Gift of Life	SOP	2006/7	No	SOP	2007	Yes	Not done	na	na	Working on DCD guidelines
Trillium Gift of Life Network	StO	2005	Yes	SOP	2006	Yes	SOP	2006	Yes	-
Transplant Quebec	GL	2004	Yes	GL	2003	Yes	Protocol	2007	Yes	-
New Brunswick Organ Donation Program	SOP	2010	No	SOP	2004	No	Not done	na	na	Goal is to start DCD in 5 years
Legacy of Life – Nova Scotia Organ & Tissue Donation Program*	StO	2004	Yes	GL	2003	Yes	GL	2008	Yes	-
Organ Procurement Exchange of Newfoundland and Labrador	SOP	2009	Yes	SOP	2009	Yes	Not done	na	na	Unable to provide DCD, transfer to NS if family request DCD

Abbreviations:

DCD=donation after cardiocirculatory determined death; GL=guideline; HG=have guideline; NDD=neurological determination of death; RR=regular review; SOP=standard operating procedures; StO= standard or standing orders; YR=year implemented.

Color scheme:

LIGHT GREEN= “previously based on CCDT” or “in part based on these forums” or there are several references along with CCDT in the document
GREEN= based on CCDT/main reference in the doc is CCDT; RED=no reference to CCDT recommendations.

*None of the documents received from the Nova Scotia program had references – reference to CCDT was established by email correspondence.

Solutions

Workshops and Training Courses

- DCD Workshop, Winnipeg, Saskatchewan Jan 2014
- End-of-Life Conversations with Families, Mar 2015
- Annual presentations and programs at conferences in collaboration with:
 - *Canadian Critical Care Forum*
 - *Canadian Association of Critical Care Nurses*
 - *Canadian Critical Care Conference*
 - *Transplant Atlantic*
 - *Canadian Society of Transplantation*
 - *International ad hoc- ISODP, TTS, Sweden, Norway, South Korea, Saudi Arabia, Japan*

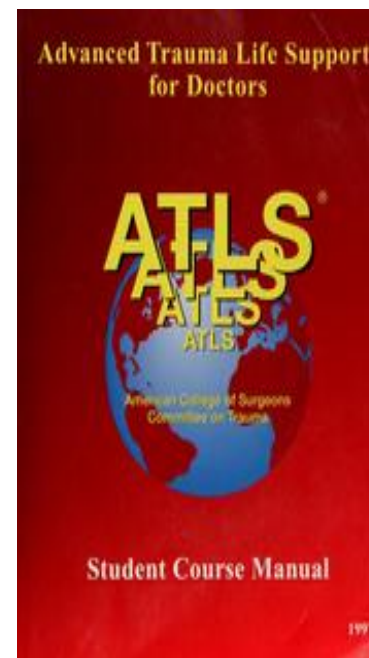
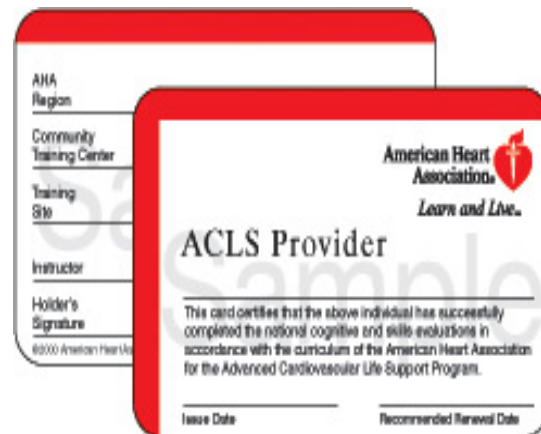
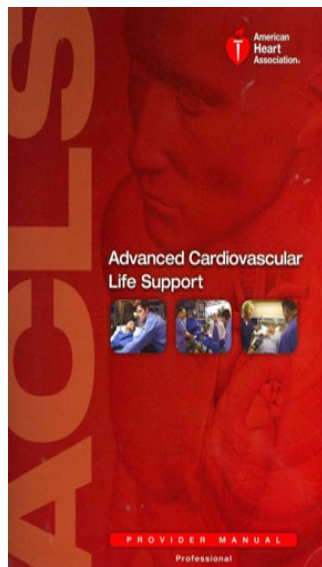


Solutions

National Professional Education Curriculum in Deceased Donation

Jennnifer Hancock, Ken Lotherington

- Professional education advisory committee
- Professional education web portal
- Organ donation course and certification



Solutions

Donation Physicians - The professionalization of donation services

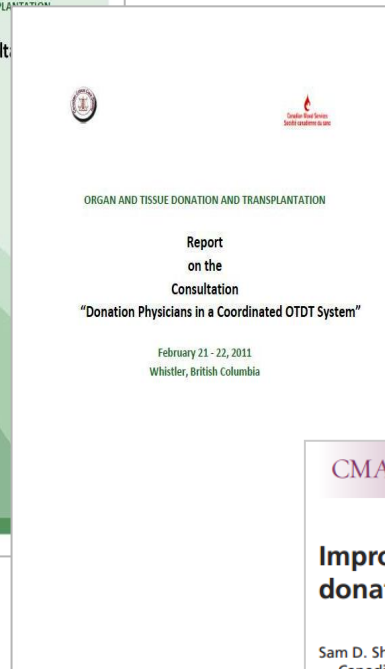
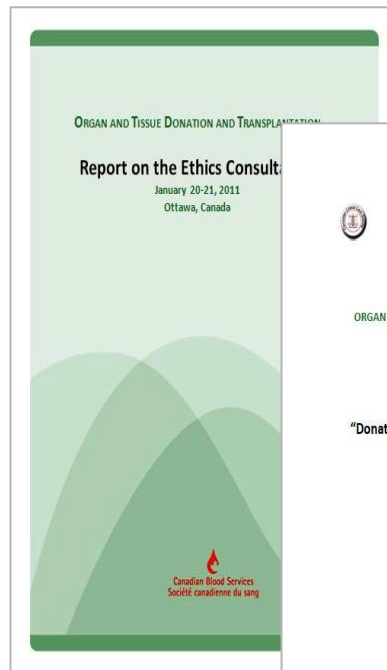
Organ donation as a **subspecialty of ICU services** lead by funded ICU physicians supported by donor coordinators

- 24x7 multi-hospital clinical service for all forms of deceased donation
- Quality assurance
- Performance metrics and accountability
- Clinical training and academic development
- Clinical trials, research and innovation

Solutions

Canadian Blood Services' role in development Canadian donation physicians

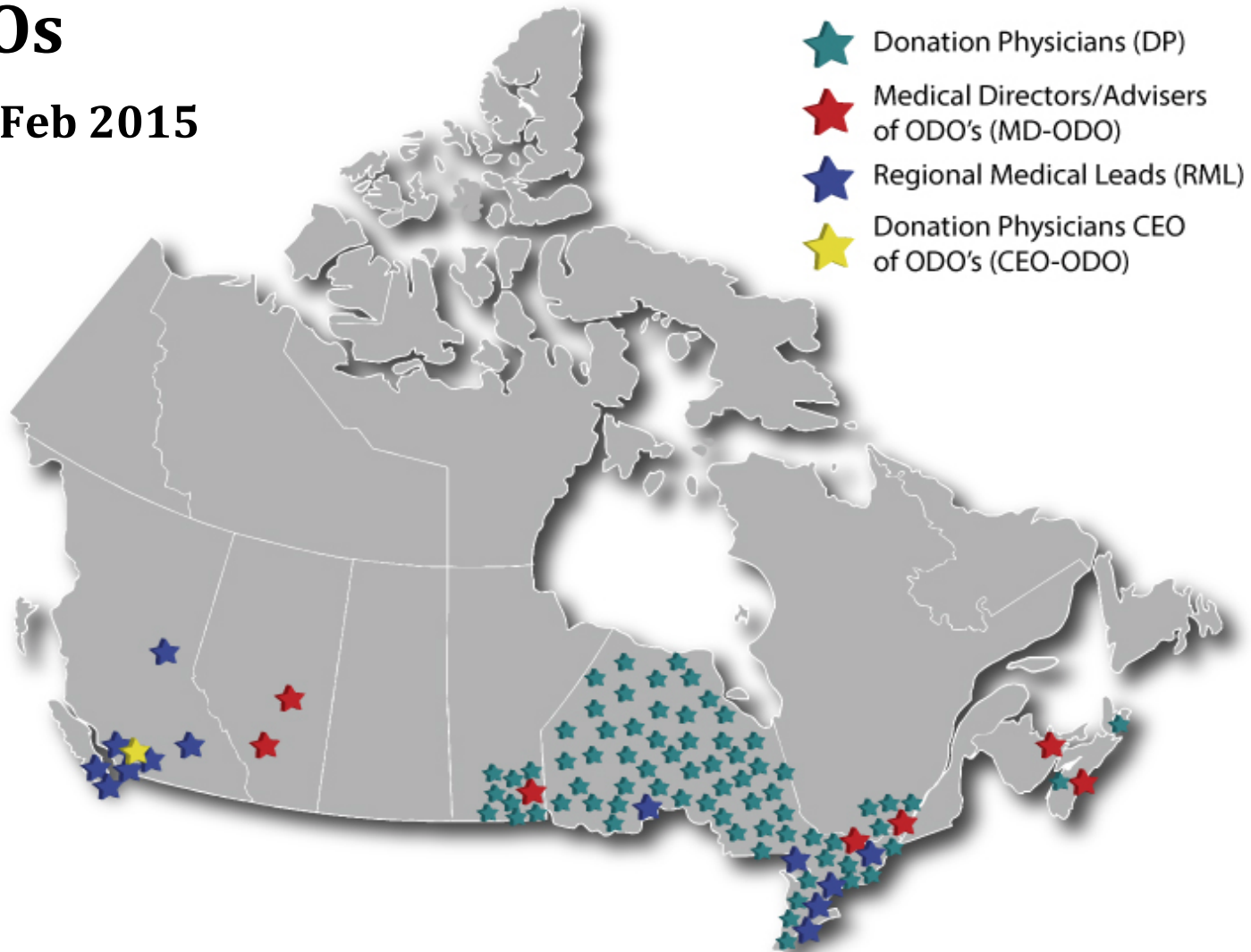
- OTDT Ethics Consultation – Jan 2011
- “Donation Physicians in a Coordinated OTDT System” forum – Feb 2011
- Ethics Guide for Donation Physicians – Feb 2015



Solutions

Implementation of donation physicians by ODOs

As of Feb 2015



Ethics Guide for Donation Physicians

Recommendations developed through a national collaboration among Canadian deceased donation experts and bioethicists. Endorsed by the Canadian Medical Association

February 23-24, 2015

Released: October 2015



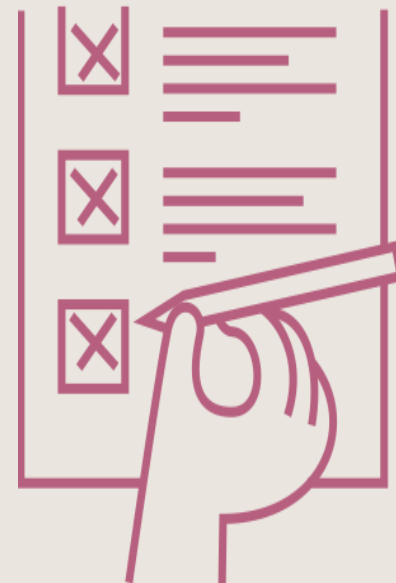
Steering Committee

- Sam Shemie
- **Christy Simpson**
- Jeff Blackmer CMA
- Paul Byrne
- Shavaun MacDonald
- Sonny Dhanani
- Sylvia Torrance
- Dorothy Strachan

Recommendations

1. Benefits of the DP role
2. Communication with families
 - role disclosure, consent
3. Interprofessional conflicts
 - dual roles
 - conscientious objection
4. Donation clinical practices
 - NDD, DCD
5. Metrics, resources, remuneration

Results

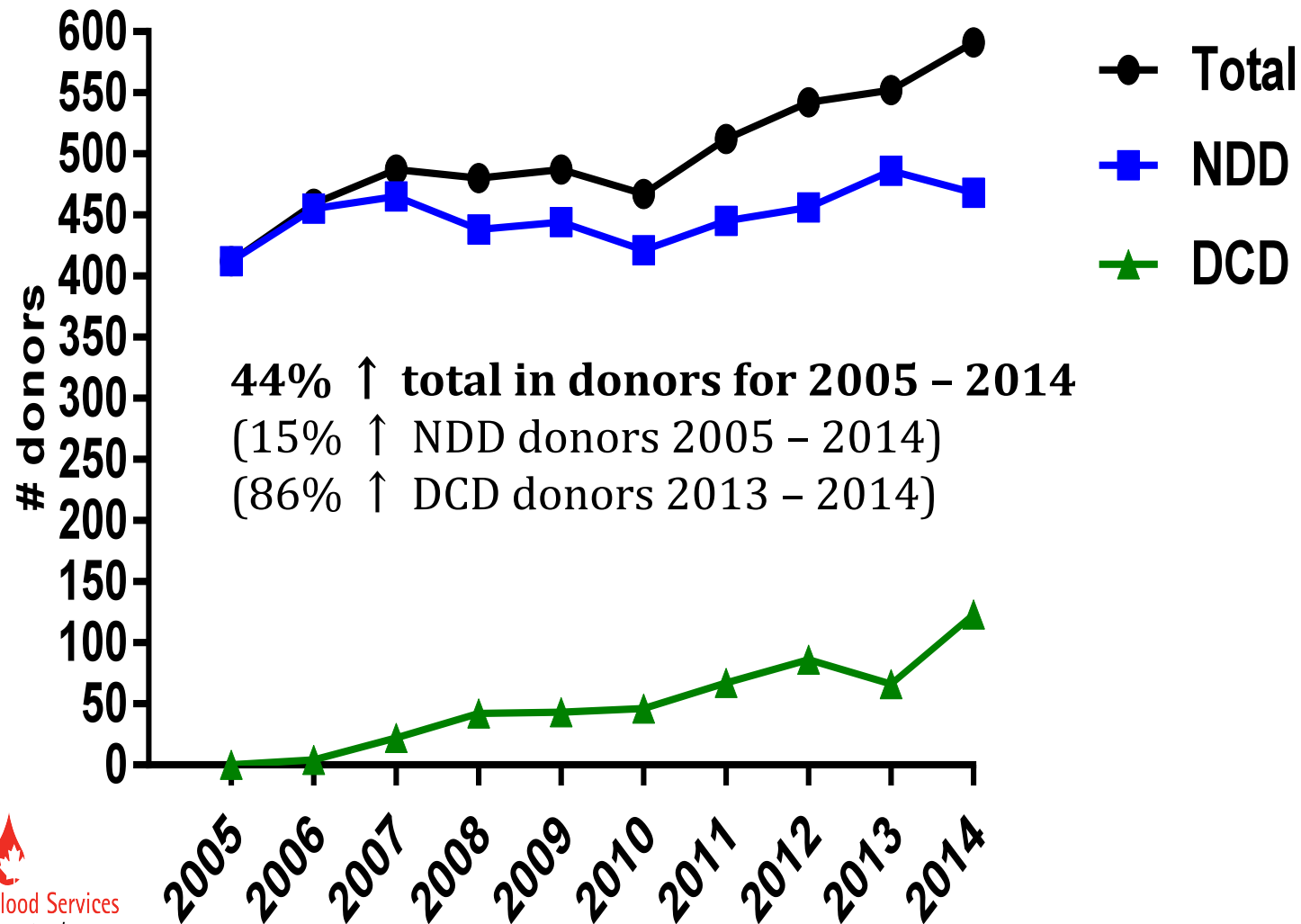


Results

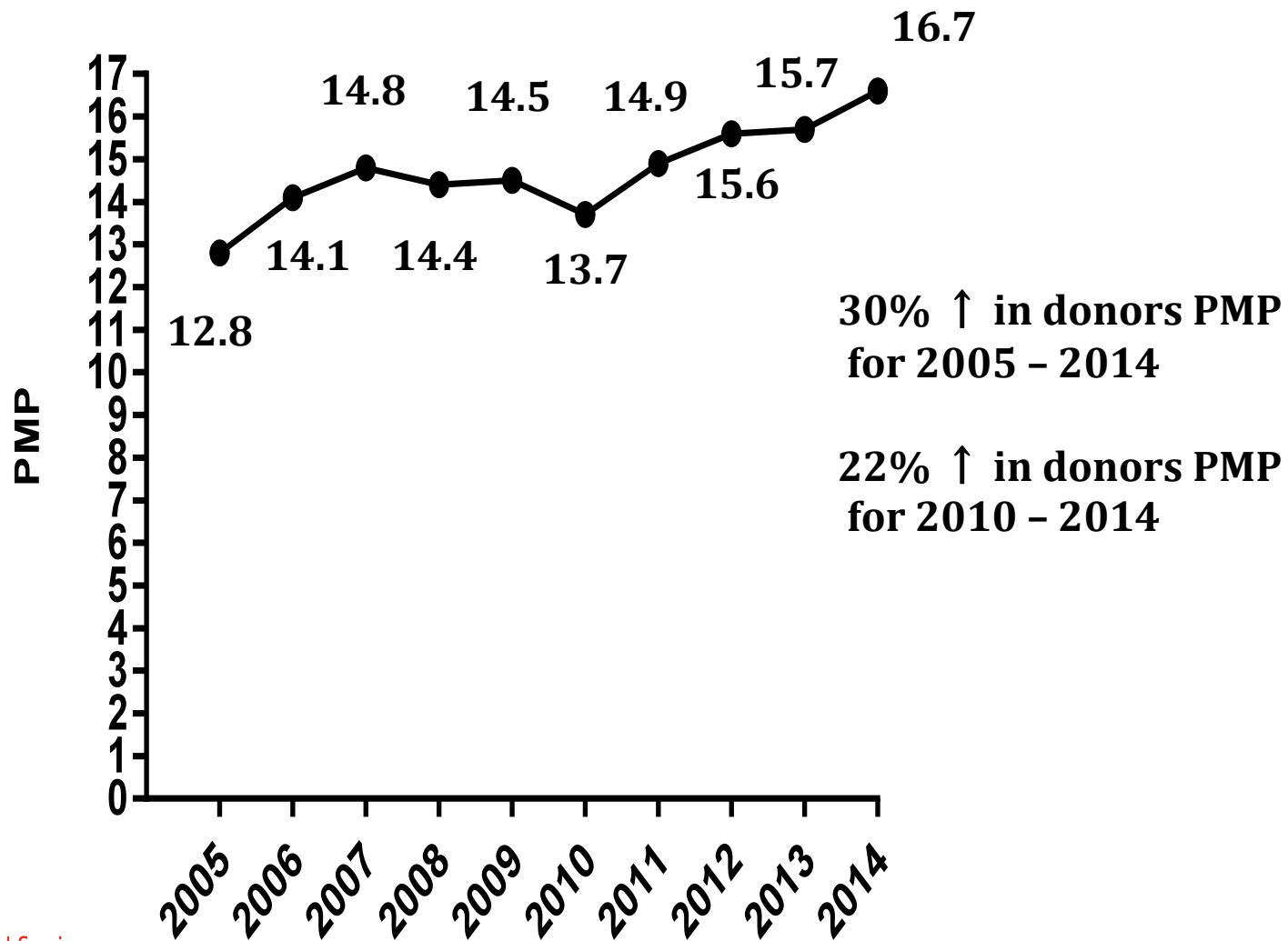
Data sources

- Canadian Organ Replacement Registry (CORR): e-stats 2004 – 2012
- Transplant Quebec statistiques officielles: 2012
- Provincial ODOs: 2013, 2014 data & corrections
- Donation & Transplant Administrators Advisory Committee: validation of 2013 & 2014 data
- Population statistics - Statistics Canada Demography Division, “Annual Estimates of Population for Canada, Provinces and Territories, from July 1 1971 to July 1 2014”, release date 09/26/2014

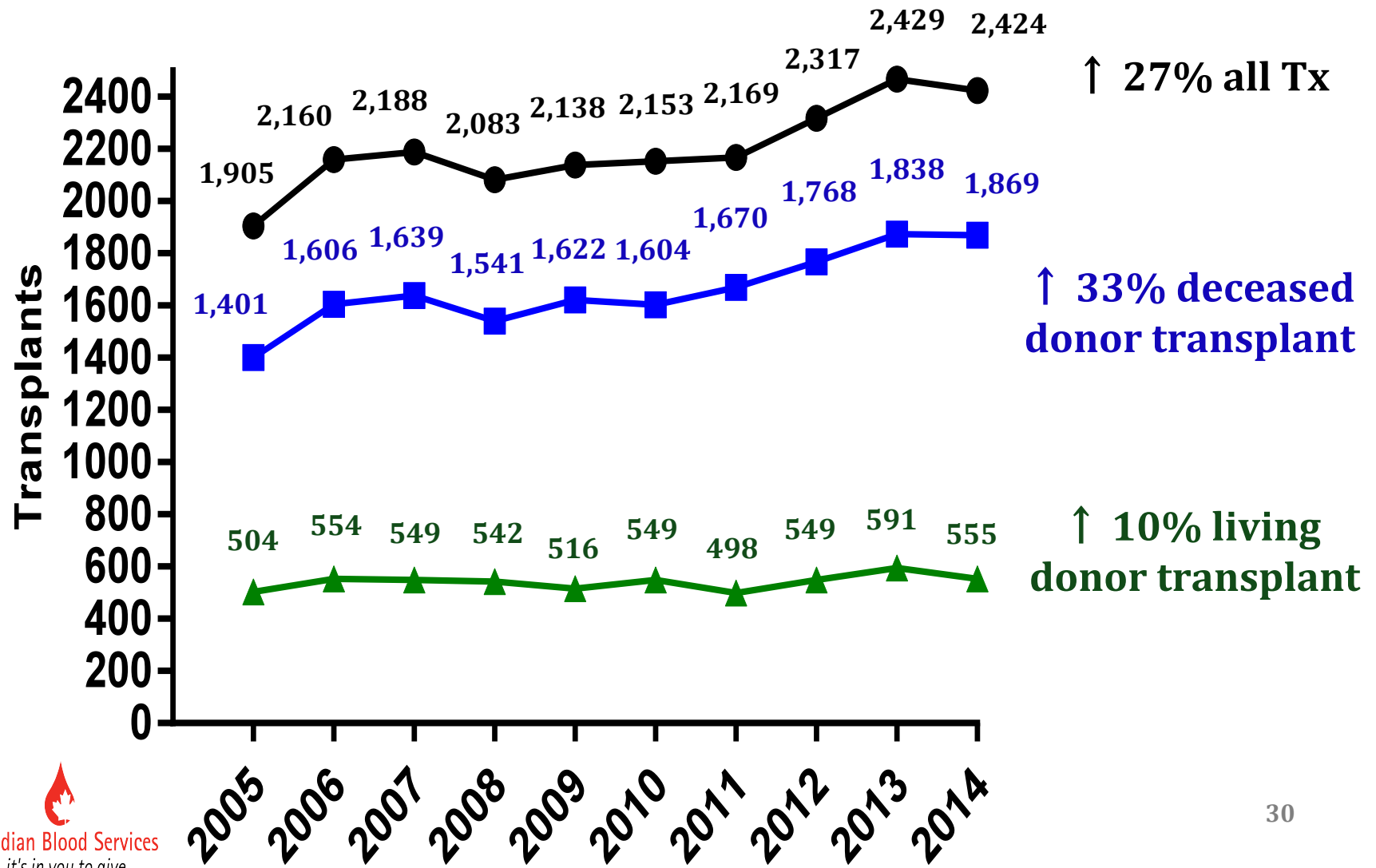
Deceased organ donation Canada 2005 - 2014



Deceased organ donation rates per million population (PMP) Canada 2005 - 2014

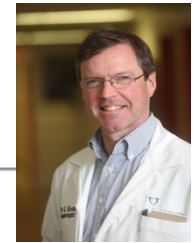


Transplants Canada 2005 - 2014





Some History



Organ and tissue donation in the intensive care unit

Graeme M. Rocker,
for the Canadian Critical Care Society Working Group on Organ and Tissue Donation

When patients will not survive (e.g., after severe head injuries), intensive care unit (ICU) teams face the challenge of conducting empathetic,

honest
sue d
apprc

donation in all eligible circumstances. In consequence, alternative ways to achieve improved rates of consent to organ and tissue donation within ICUs have been proposed. In the United States, for example, these initiatives include mandating representatives of transplant procurement organizations rather than ICU or hospital-based teams to inter-

act with families at the time of death in the ICU. In Canada, other initiatives have resulted in provincial legislation that requires ICU physicians to provide outside agen-

z death — details that
tial. This particular re-
it contentious for criti-

Called for a Moratorium on DCD

cal care specialists.

The irony is that ICU physicians are as committed as any to the concept of successful organ and tissue donation, but we act and must act in the interests of our patient — the potential donor in the ICU — and his or her family. Transplant surgeons and transplant organizations have

Non-heart-beating organ donation in Canada: Time to proceed?

Greg A. Knoll, John E. Mahoney

Despite the proven success of solid organ transplantation, relatively few Canadians benefit from this therapy because of a shortage of organ donors. Over the past decade, the number of Canadians waiting for a transplant has increased by 84%, to nearly 4000, while

units (ICUs). The most successful education programs have been locally driven.^{13,14} In Spain, transplant coordinators from a successful NHBD program organized courses and workshops to educate hospital personnel, later expanding their educational initiative to include an annual

Established the medical, ethical & legal framework for the practice of DCD in Canada

The Canadian Council for Donation and Transplantation

Donation After Cardiocirculatory Death:

A Canadian Forum

February 17–20, 2005

Vancouver, British Columbia

Donation after cardiocirculatory death in Canada

Sam D. Shemie, Andrew J. Baker, Greg Knoll, William Wall, Graeme Rocker, Daniel Howes, Janet Davidson, Joe Pagliarello, Jane Chambers-Evans, Sandra Cockfield, Catherine Farrell, Walter Glannon, William Gourlay, David Grant, Stéphan Langevin, Brian Wheelock, Kimberly Young, John Dossetor*

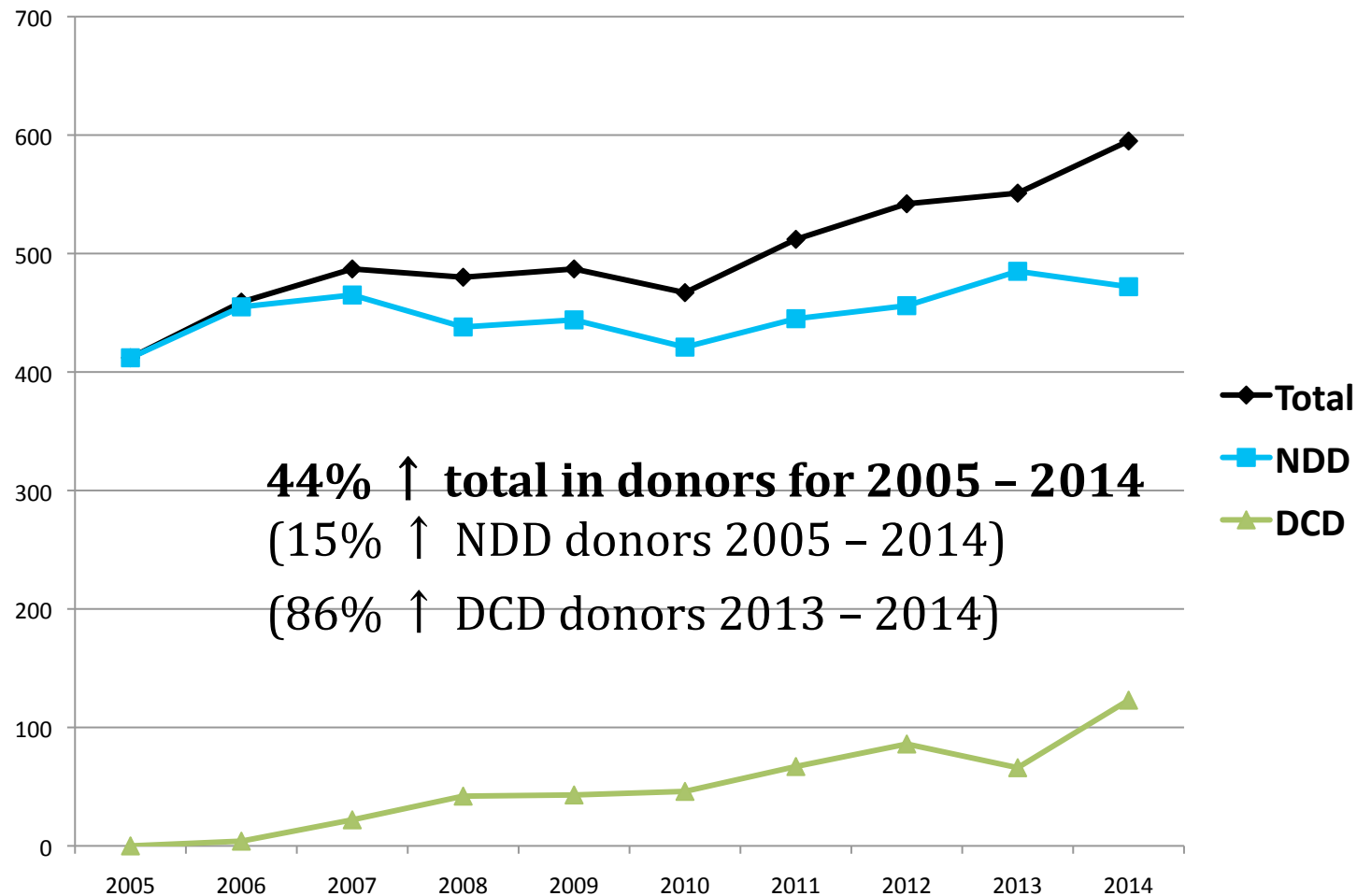
CMAJ
2006

ABSTRACT

These recommendations are the result of a national, multi-disciplinary, year-long process to discuss whether and how to proceed with organ donation after cardiocirculatory death

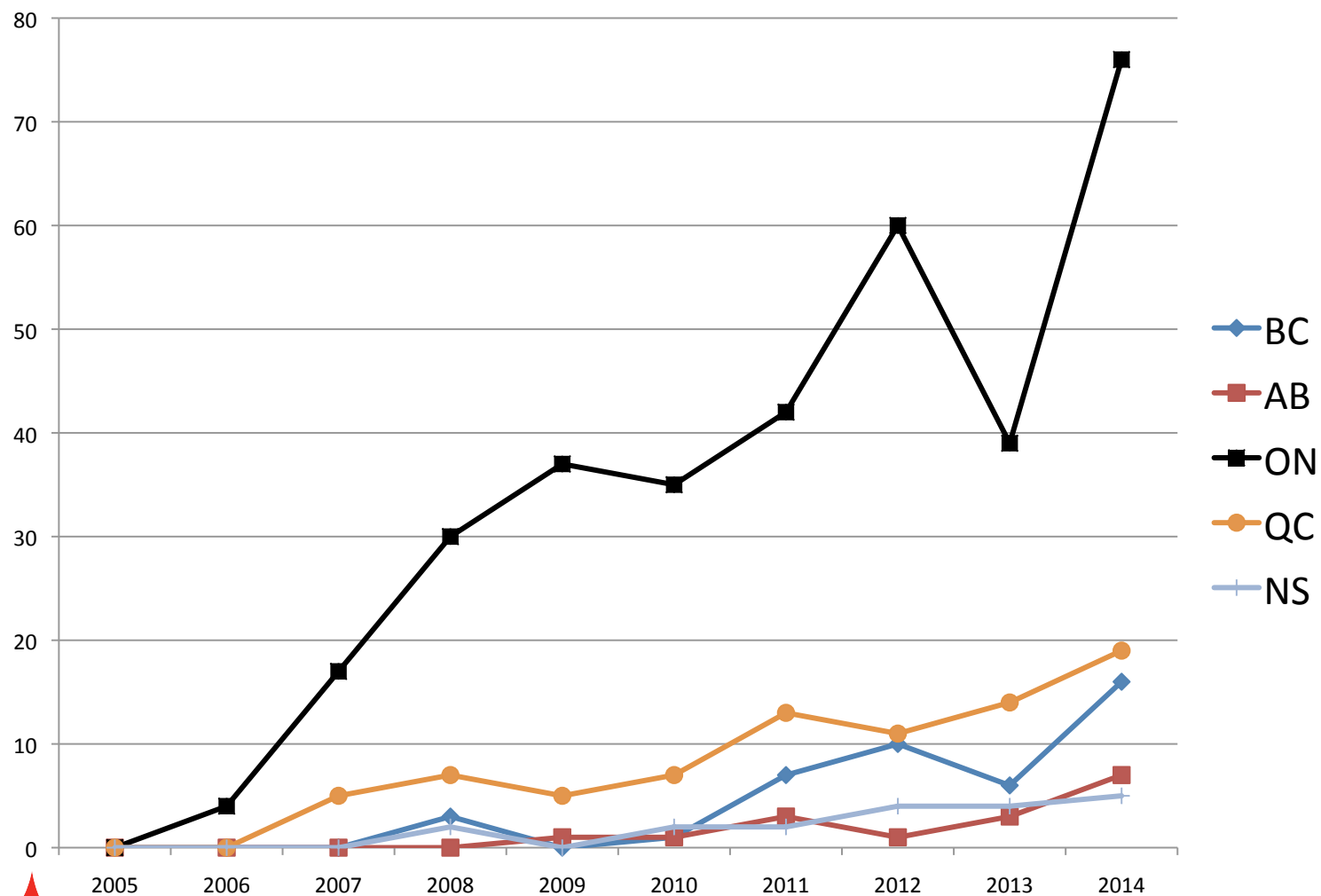
There are 2 fundamental but not mutually exclusive perspectives on organ donation. As an important part of end-of-life care, patients who die should be provided the opportunity to donate organs and tissues. Potential transplant recipients, who would otherwise die or be substantially compromised, can benefit from initiatives that

Deceased organ donation Canada 2005-2014



DCD organ donation by province 2005 - 2014

**n = 499 DCD donors
= 1136 transplants**



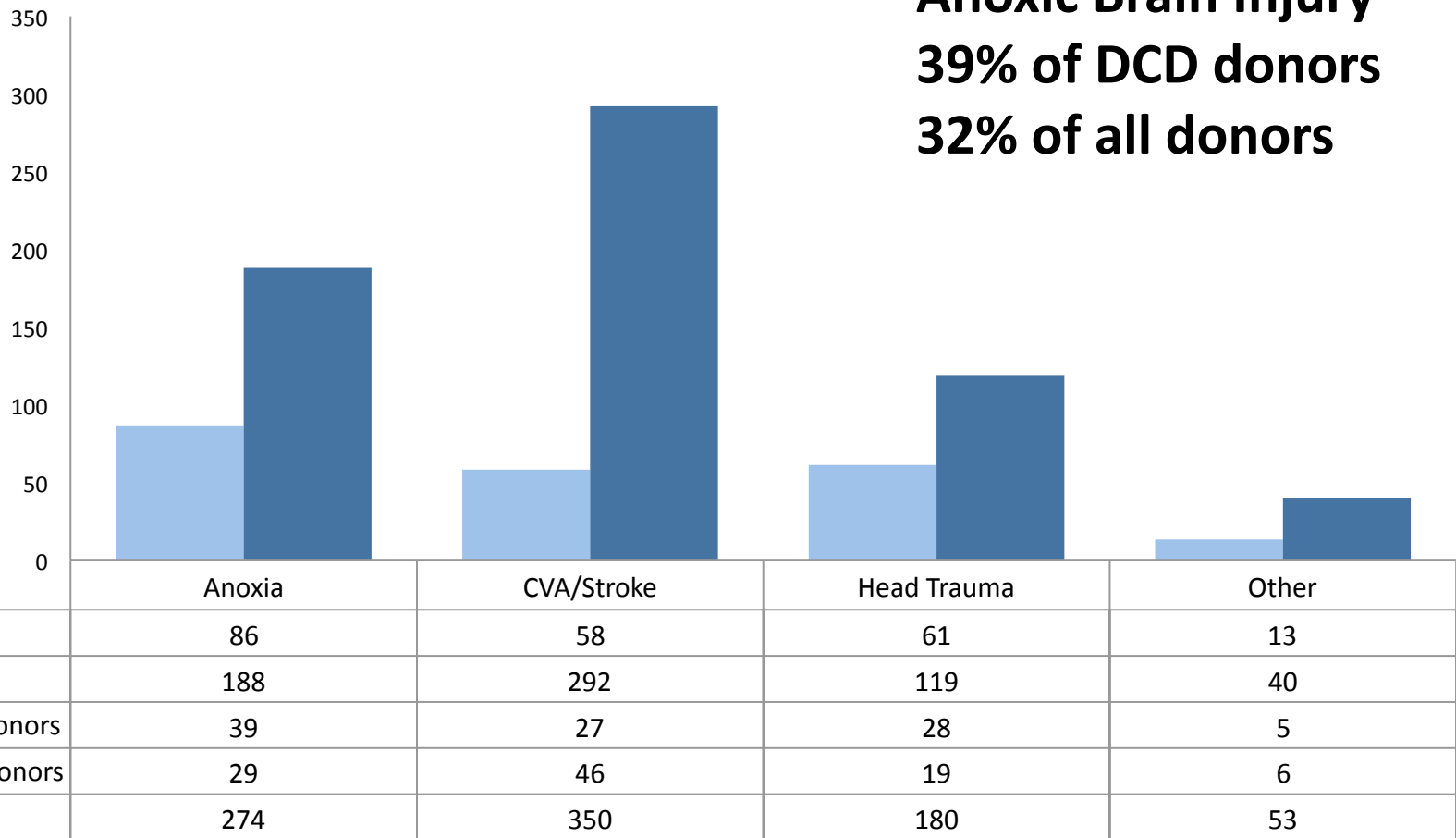
DCD Programs in Canada 2006-2015

Established:

- **Ontario (Province-wide)**
- **Quebec (Montreal, Quebec City)**
- **British Columbia**
- **Nova Scotia (Halifax)**
- **Alberta (Edmonton)**
- **Manitoba (initiated)**
- **Saskatoon (preliminary)**
- **Alberta (Edmonton implemented, Calgary pending)**

Four Leading Causes of Death by Donor Type

Anoxic Brain Injury
39% of DCD donors
32% of all donors



Total DCD Donors – 218
 Total NDD Donors – 639
 for the four leading causes of death.

*Apr 1, 2012 – Sep 30, 2015

Does DCD Steal from NDD? No!!

Donors by Type	2002/03-2005/06 Pre DCD	2006/07-2009/10 DCD era1	2010/11-2013/14 DCD era2	Change
NDD	578	679	712	+ 23%
DCD	0	96	193	N/A
TOTAL	578	775	905	+ 57%

Median number of days admission to NDD: 1.71

Median number of days admission to DCD: 4.80

Pending publication Payne et al.

An Under-Recognized Benefit of Cardiopulmonary Resuscitation: Organ Transplantation*

Alberto Orioles, MD¹; Wynne E. Morrison, MD, MBE¹; Joseph W. Rossano, MD, MS²;
Paul M. Shore, MD, MS³; Richard D. Hasz, BS, MFS, CPTC⁴; Amy C. Martinier, BA⁴;
Robert A. Berg, MD¹; Vinay M. Nadkarni, MD, MS¹

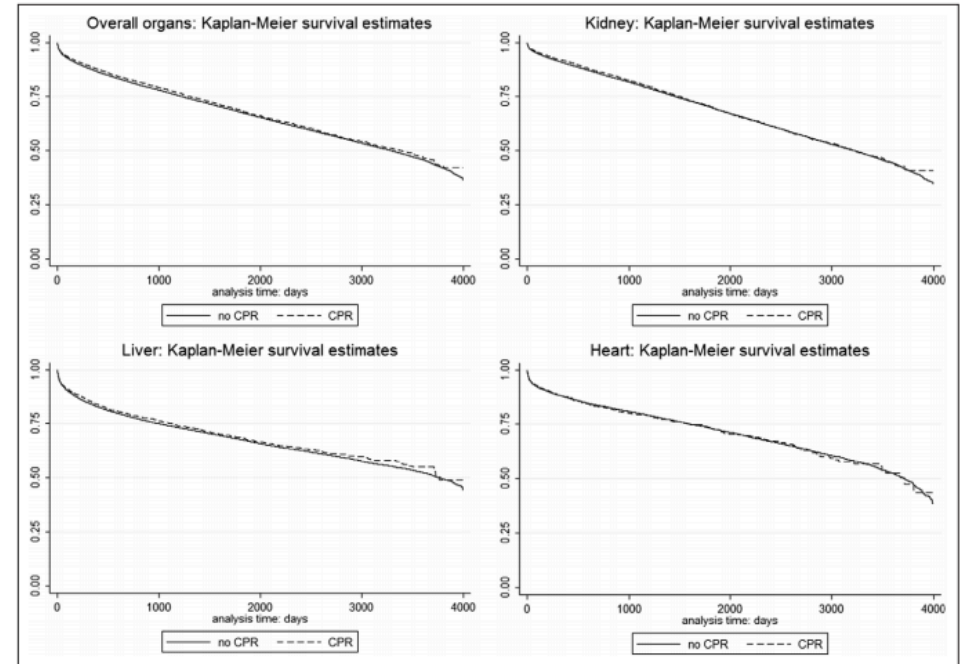
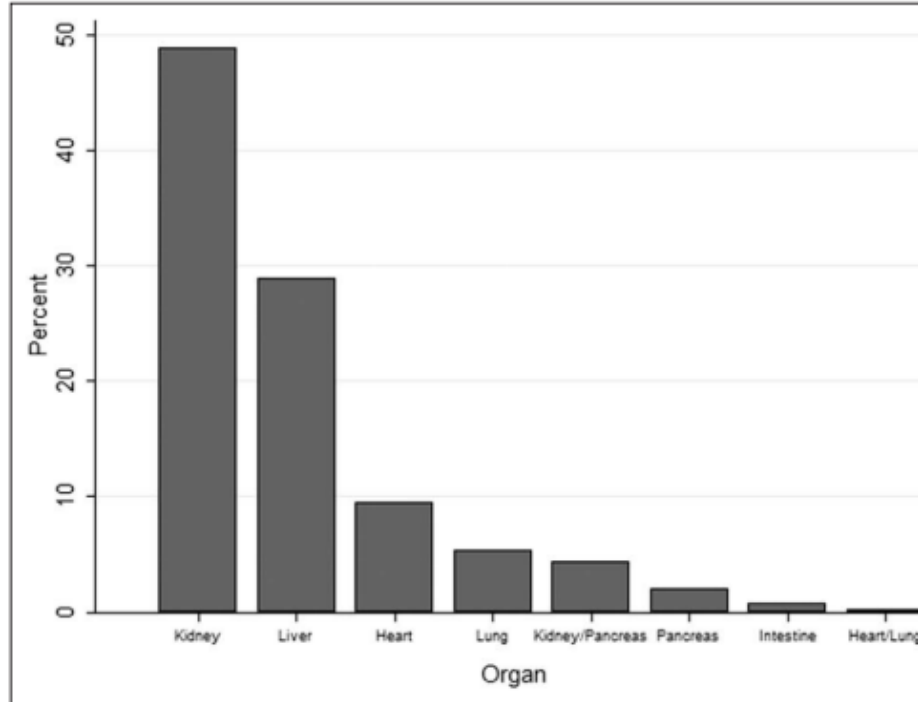


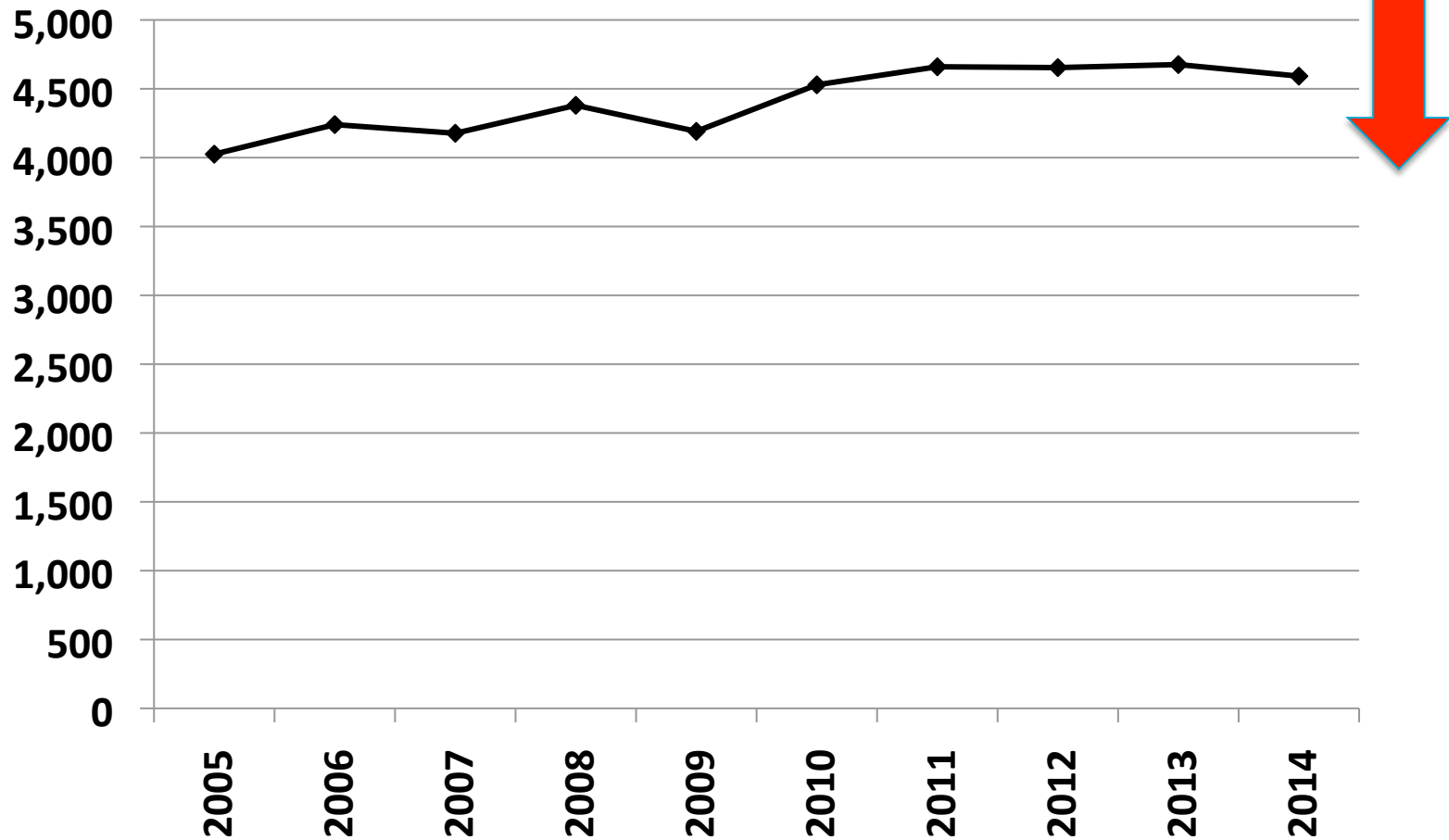
Figure 3. No difference in survival of overall organs, kidney, liver, and heart between cardiopulmonary resuscitation (CPR) organs and non-CPR organs.

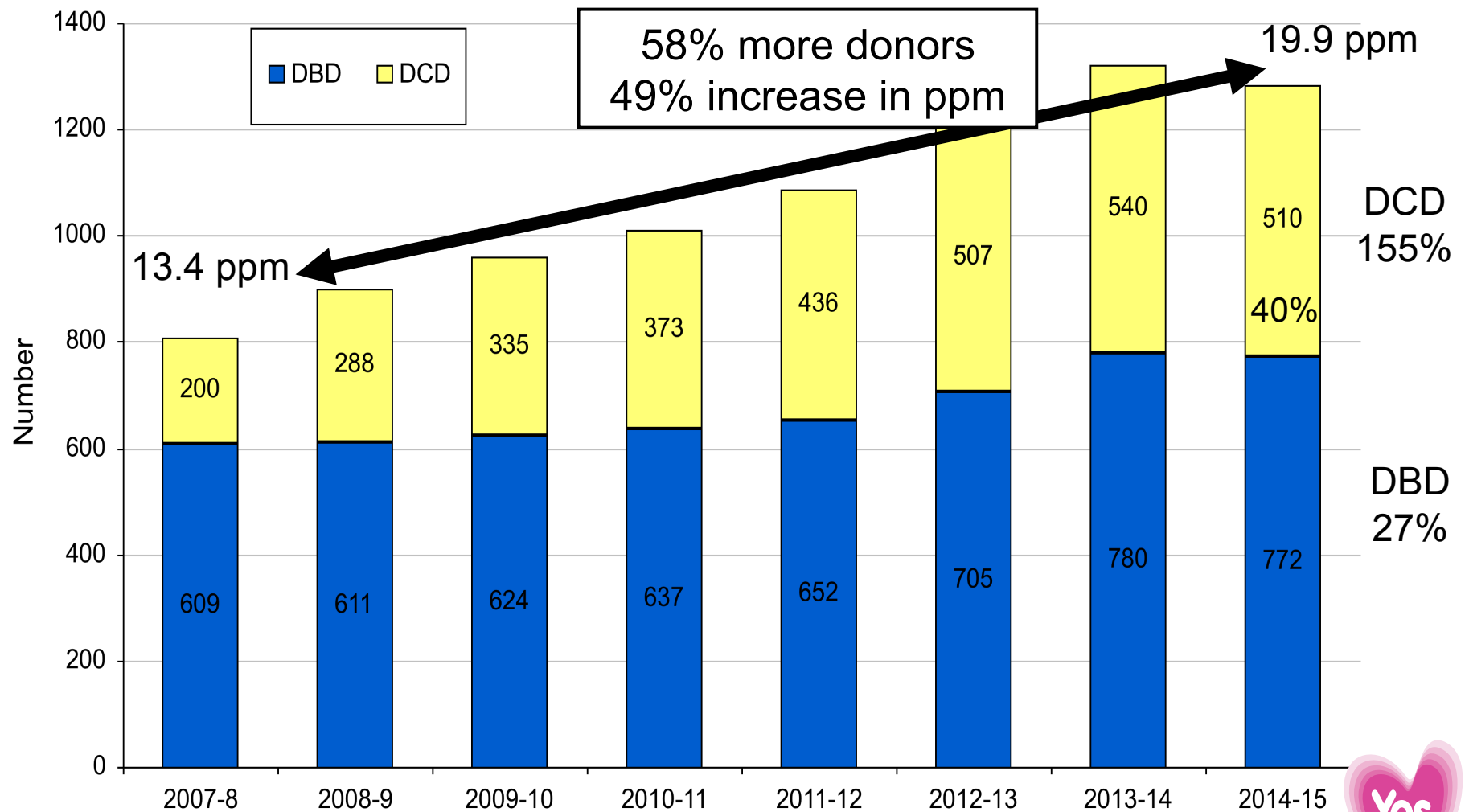
Cardiac Arrest, CPR, Deceased Donation

Differential Organ Vulnerability to Anoxia

- 1. Anoxic brain injury after resuscitated cardiac arrest is becoming the most common donor etiology**
- 2. Cardiac arrest & CPR after brain injury does not impact transplant outcomes including the heart**
- 3. DCD organs recover from ≥ 2 distinct episodes of circulatory arrest- *the brain does not***

People on transplant waitlist Canada 2005 - 2014



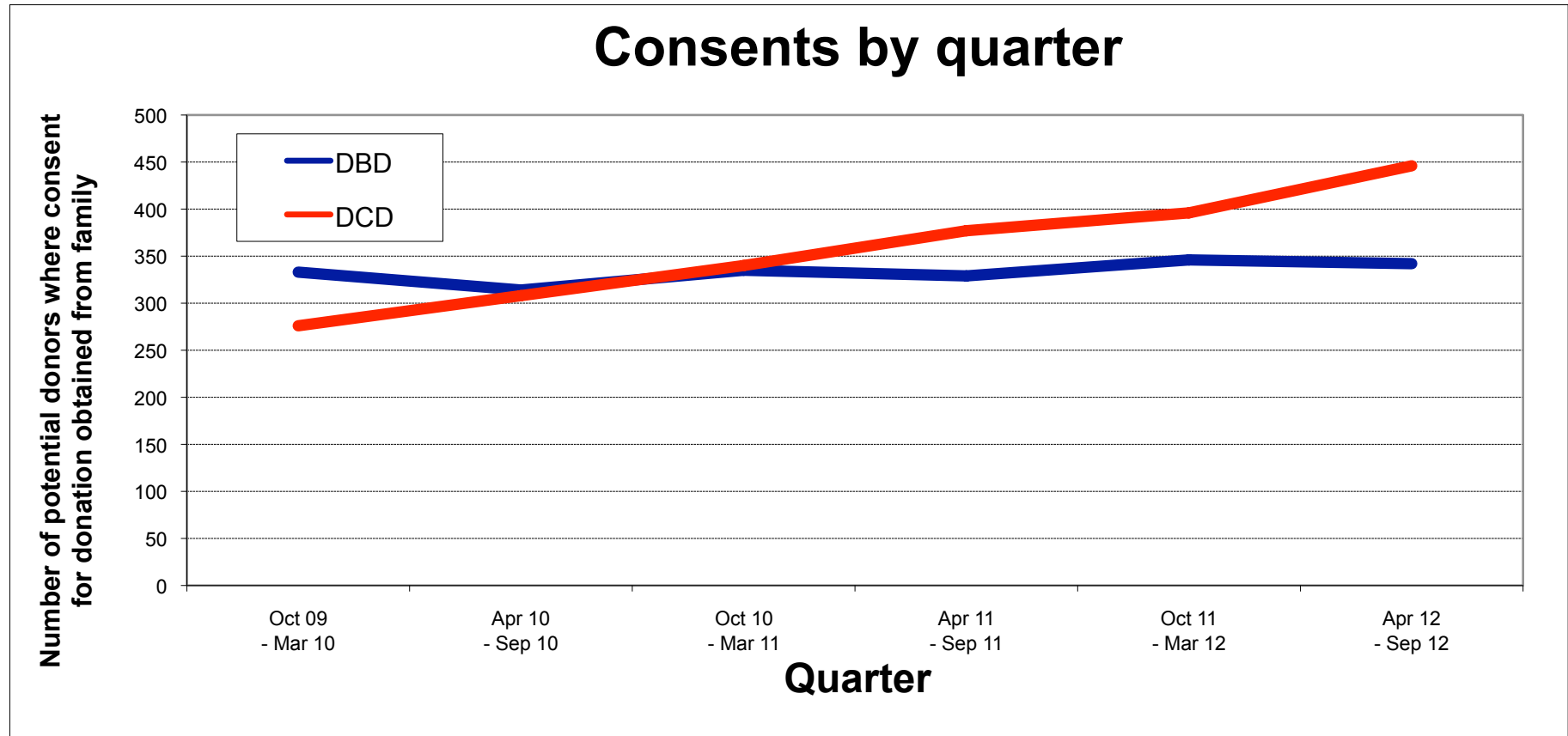


Dale Gardiner, Alex Manara, with thanks



The rise and rise of UK DCD

The most common donor pathway in ICU



April 2014 to March 2015
Family Approaches
Consents

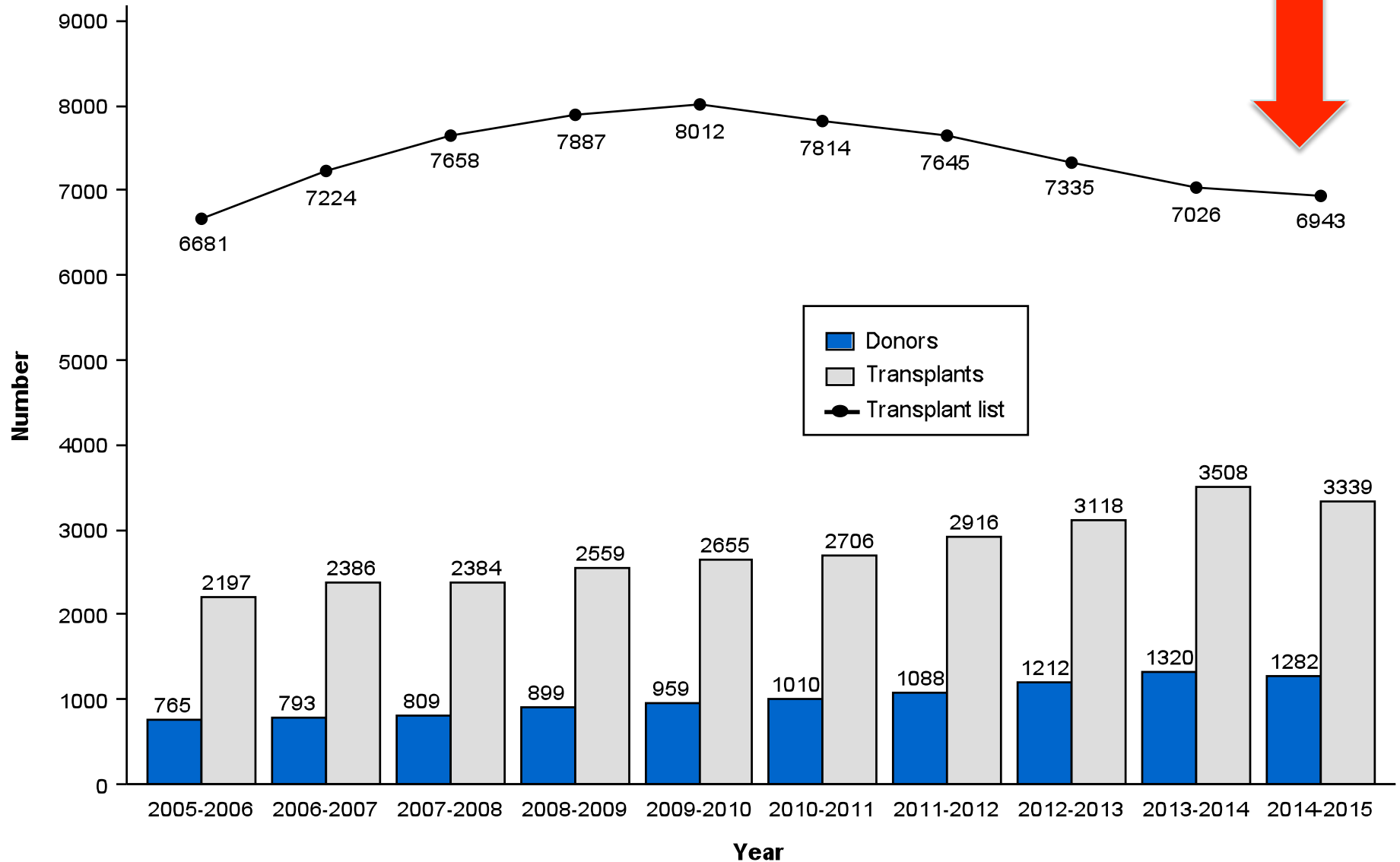
DBD
1,283
858

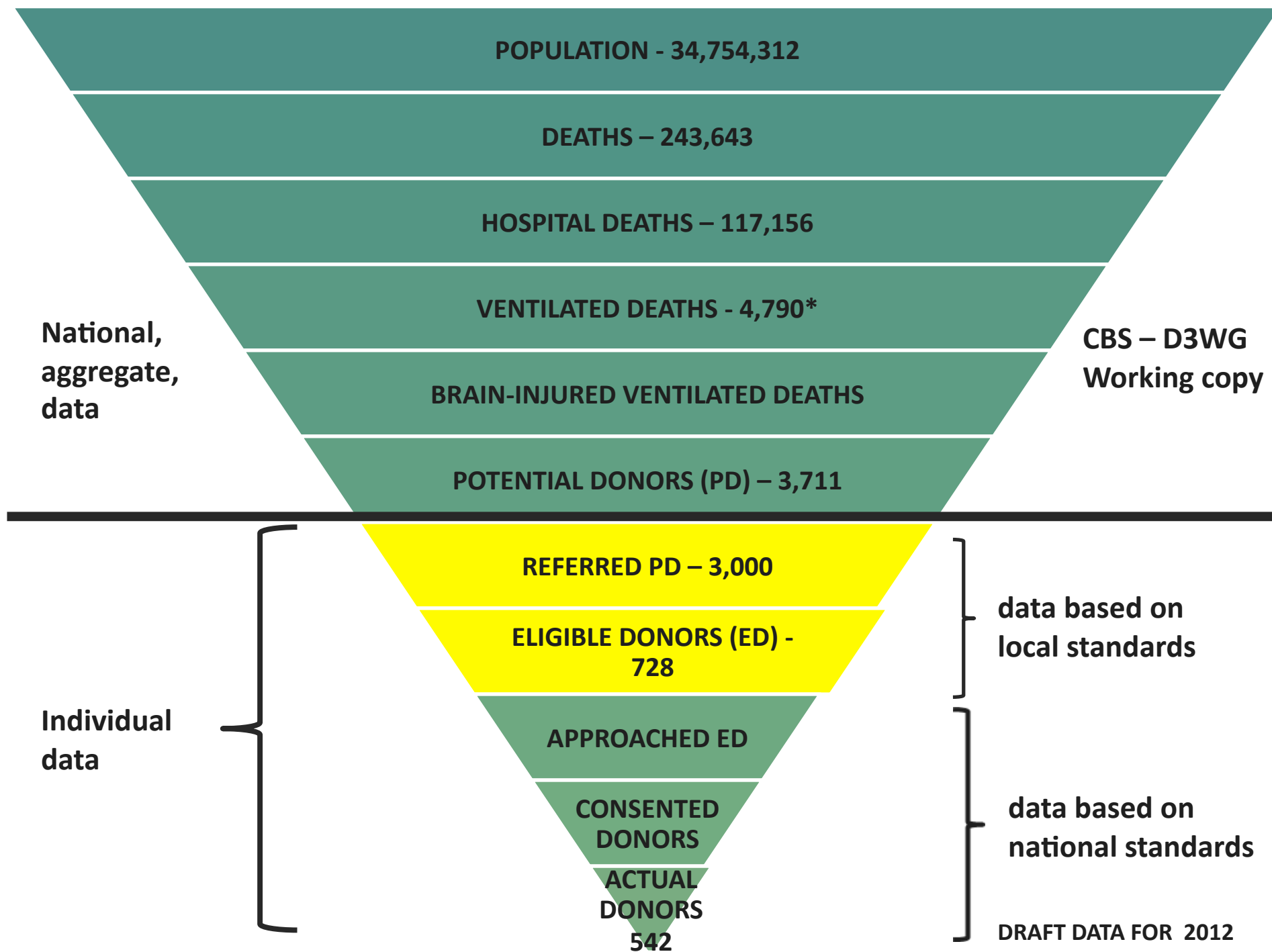
DCD
2,012
1,045

Dale Gardiner, Alex Manara, with thanks

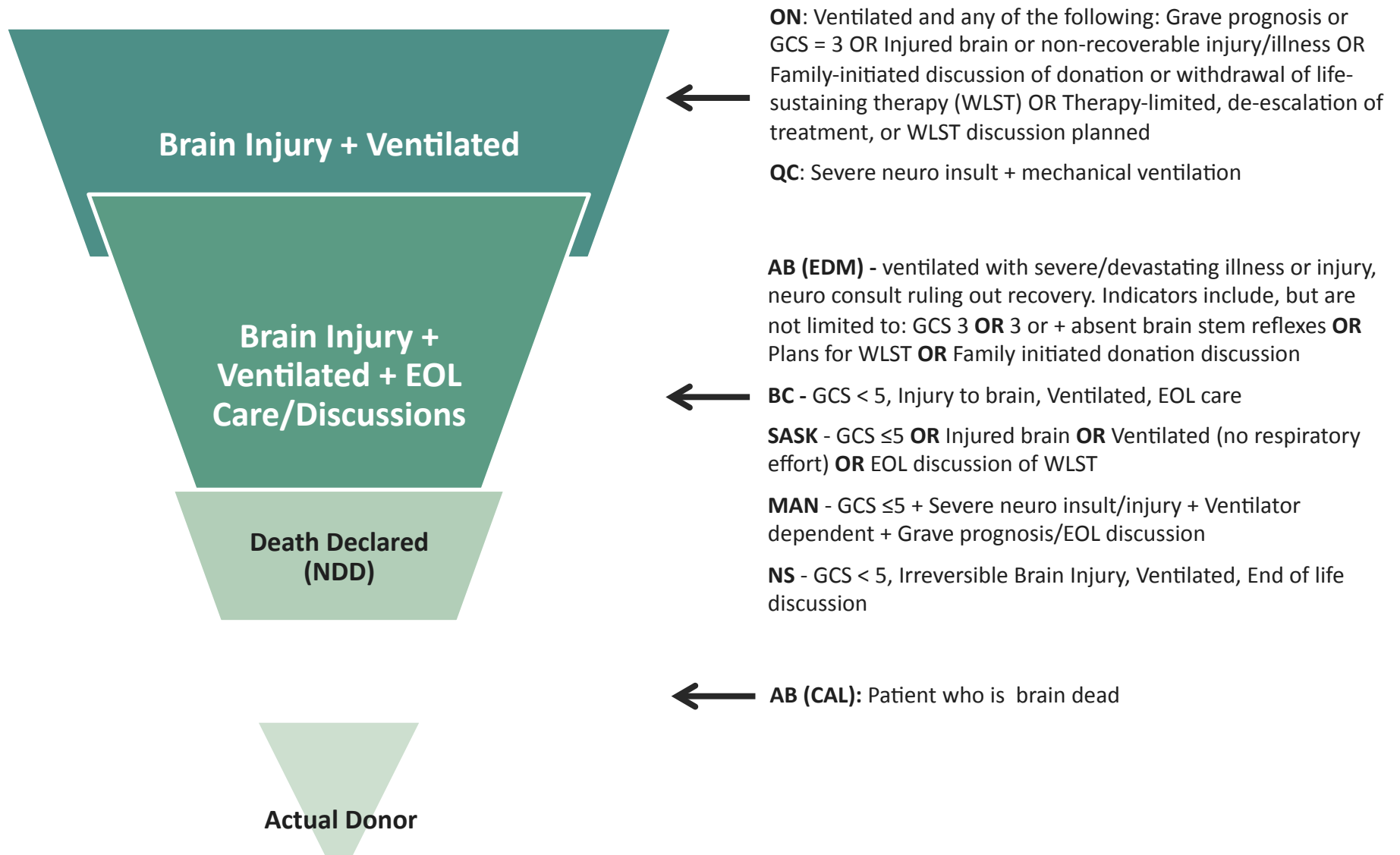


**Number of deceased donors and transplants in the UK, 1 April 2005 - 31 March 2015,
and patients on the active transplant list at 31 March**





Identifying Potential Donors in Canada



Definition of a Donor

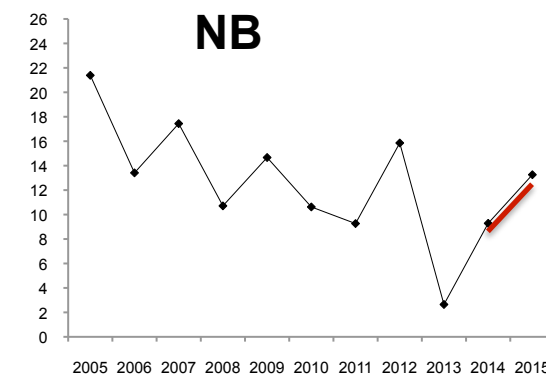
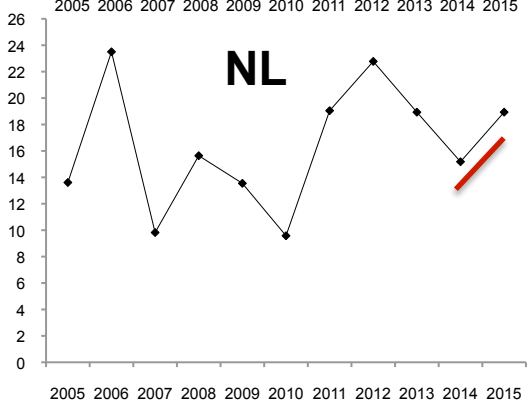
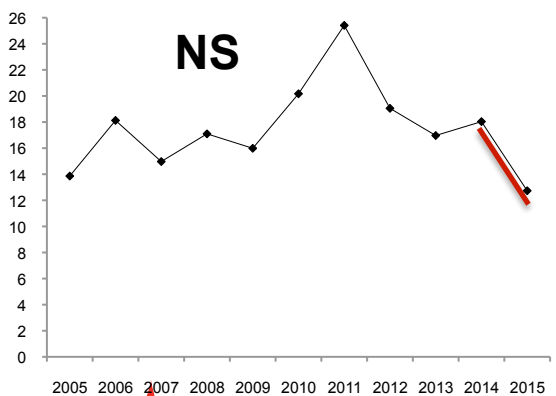
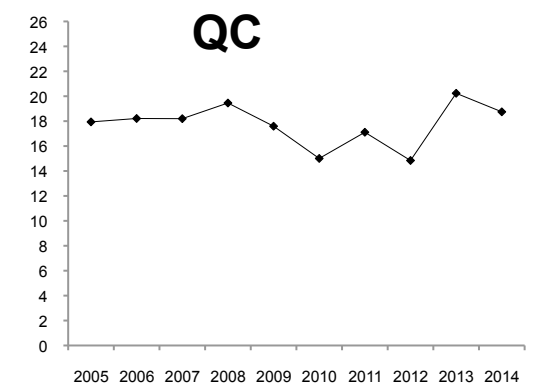
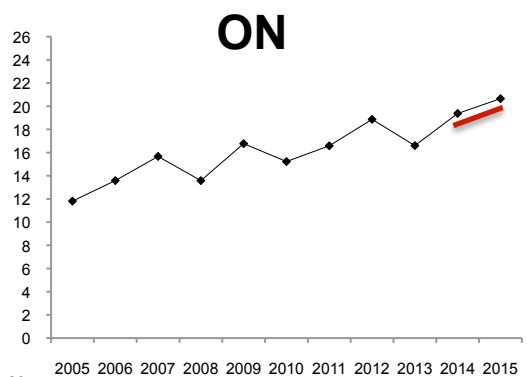
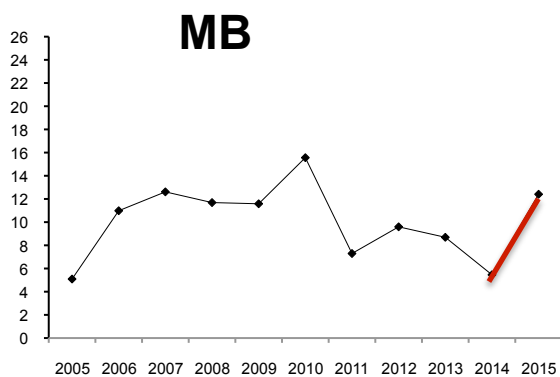
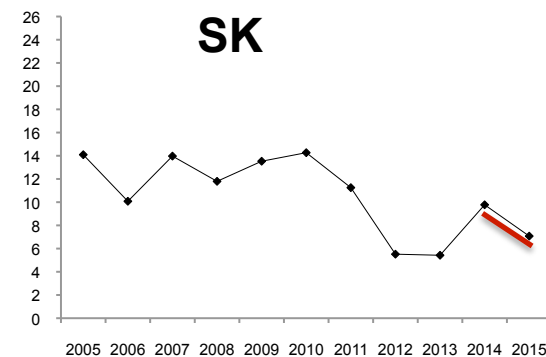
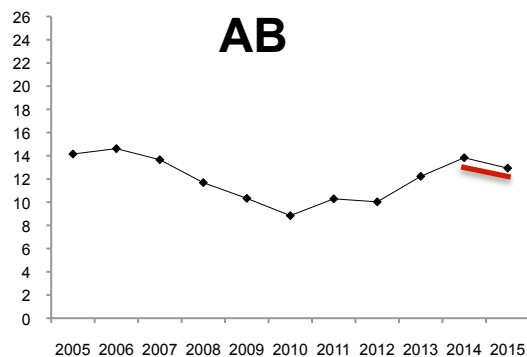
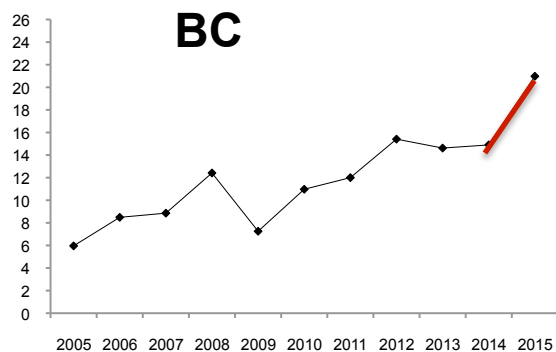
1. NDD (brain death) only?

= deceased donor rates will not improve.

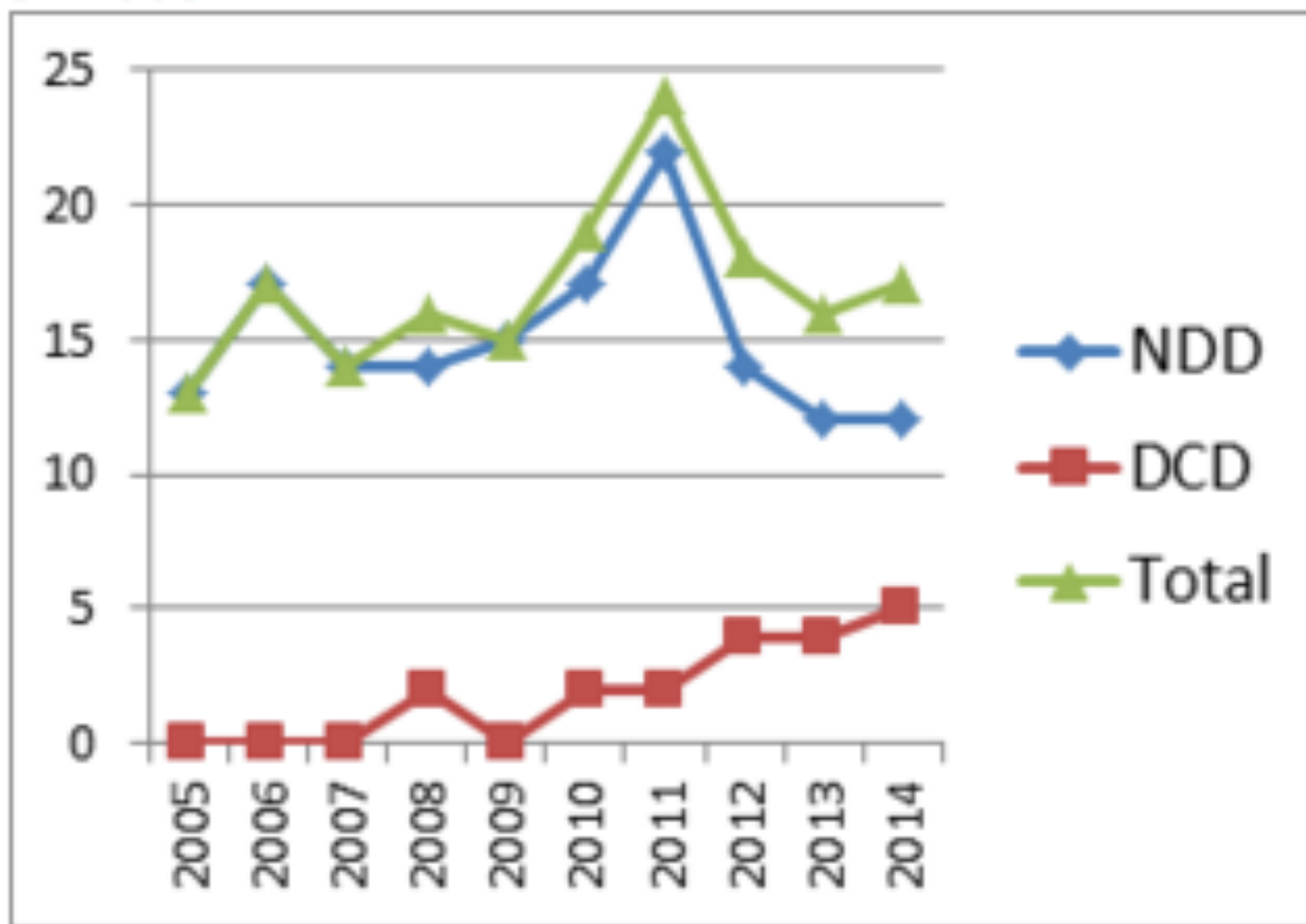
2. NDD & DCD = all patients with catastrophic brain injury who have withdrawal of mechanical ventilation?

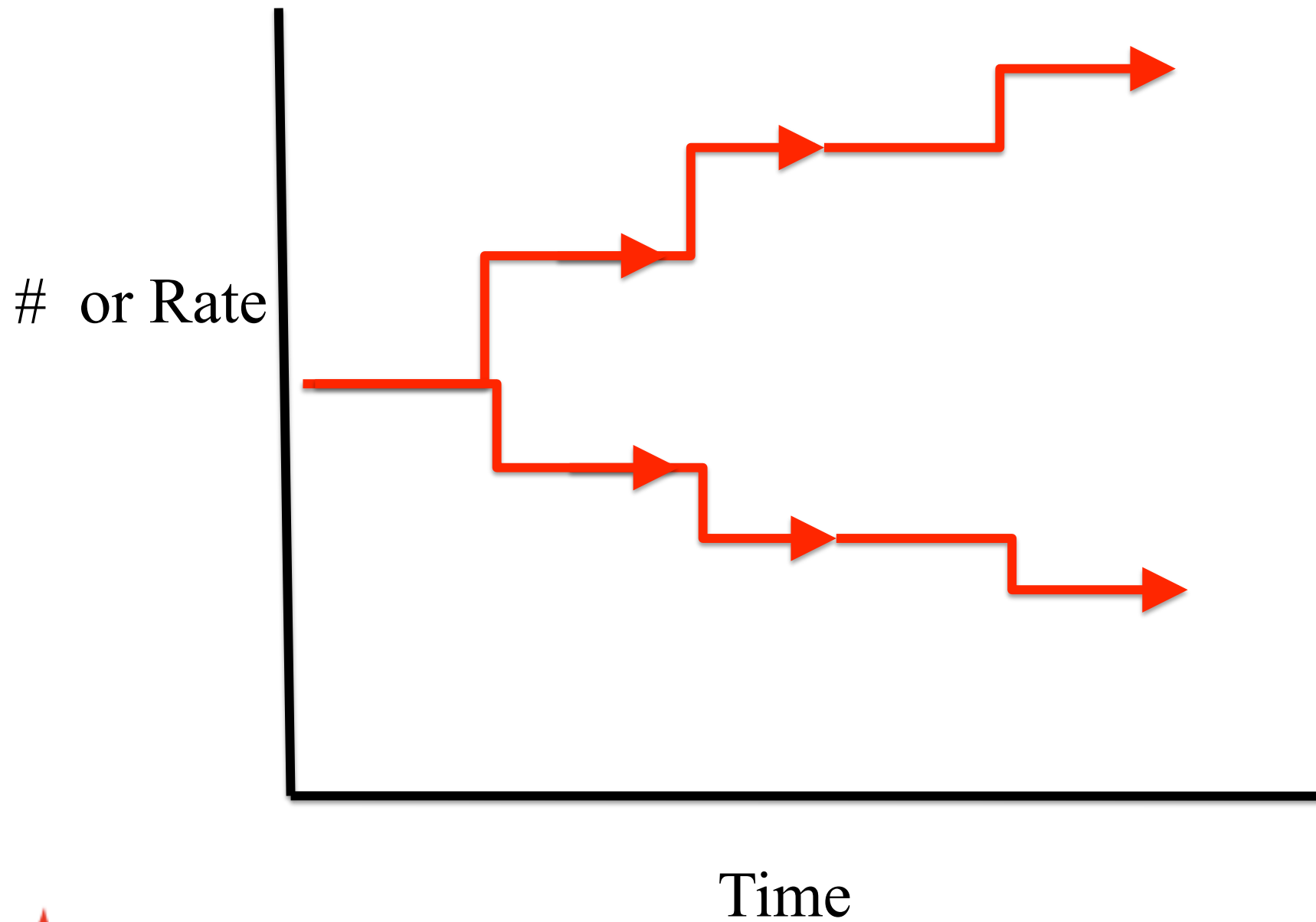
= deceased donor rates (NDD & DCD) will likely improve

Deceased donation rates per million population by province 2015 projections



NOVA SCOTIA

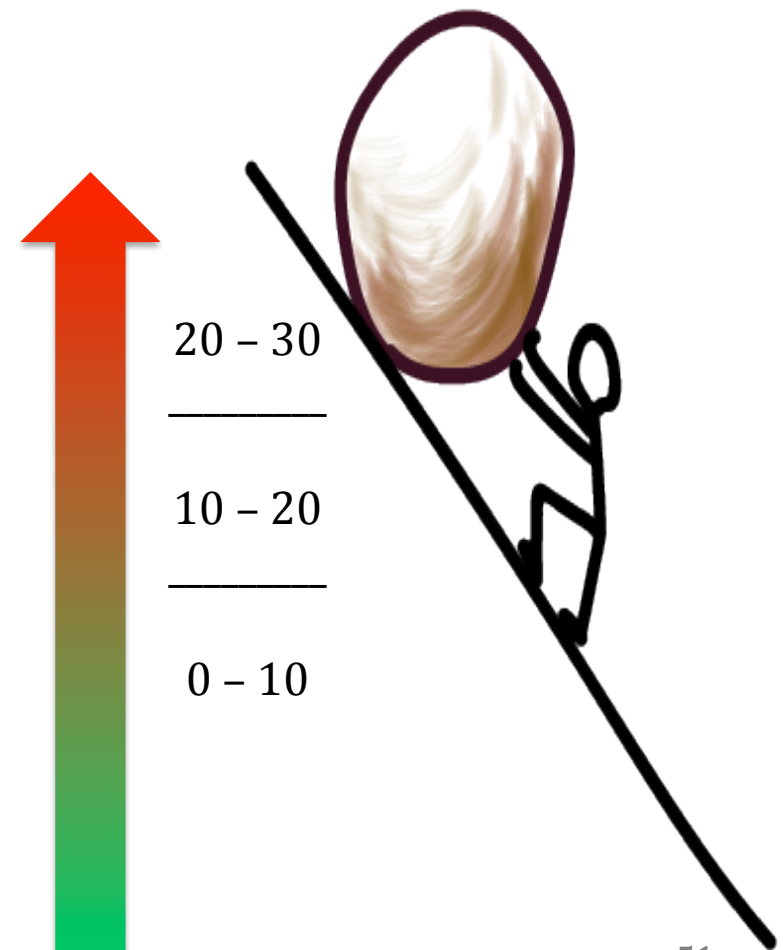




Future Activities

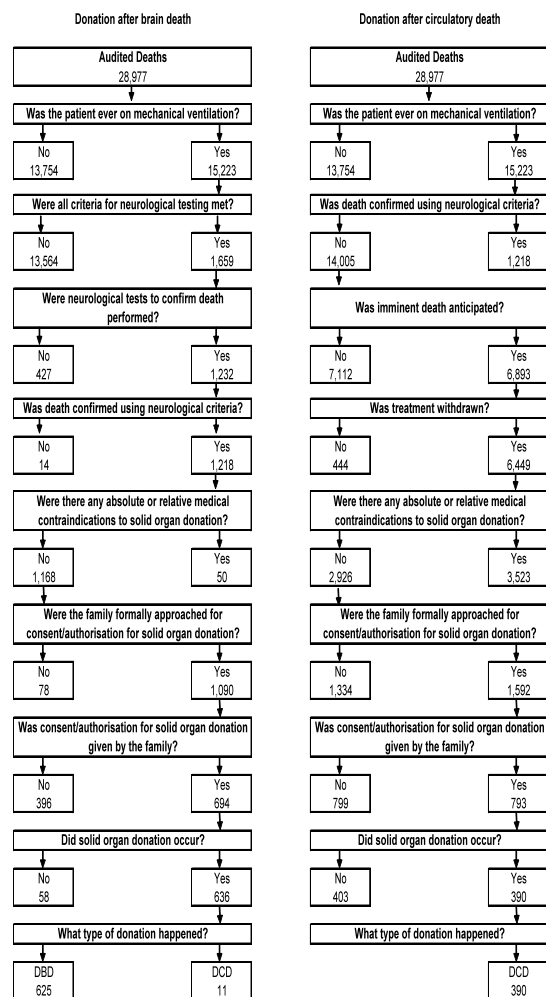
It's difficult to improve donor rates

- Hard to get to 10 dpmp
- Harder to get from 10-20 dpmp
- Much, much, much harder to get from 20-30 dpmp

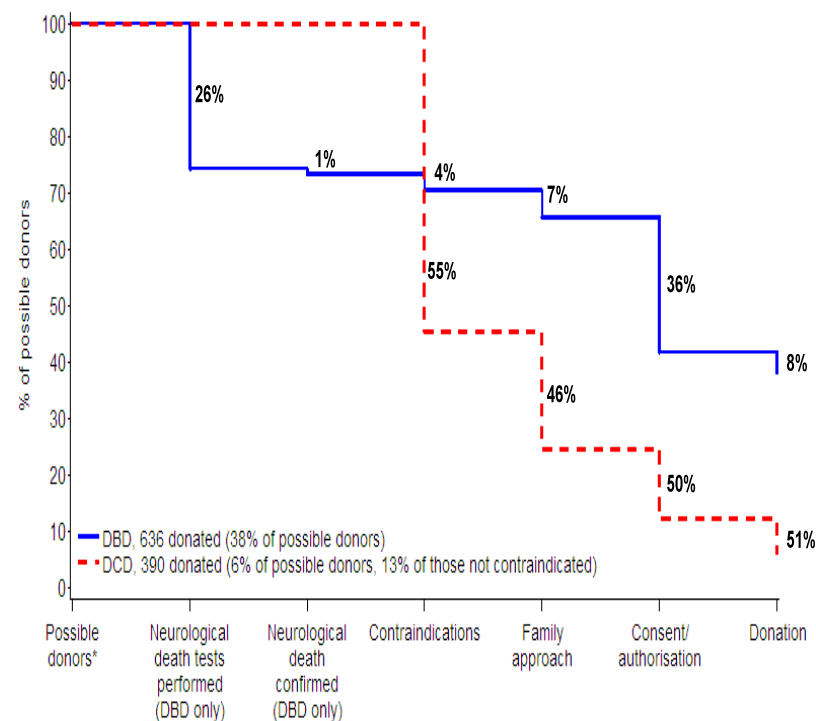


UK NATIONAL AUDIT OF POTENTIAL DONORS

Breakdown of audited deaths in ICU's, 1 April 2011 – 31 March 2012



Stages at which possible organ donors lose the opportunity to become actual donors, 1 April 2011 to 31 March 2012

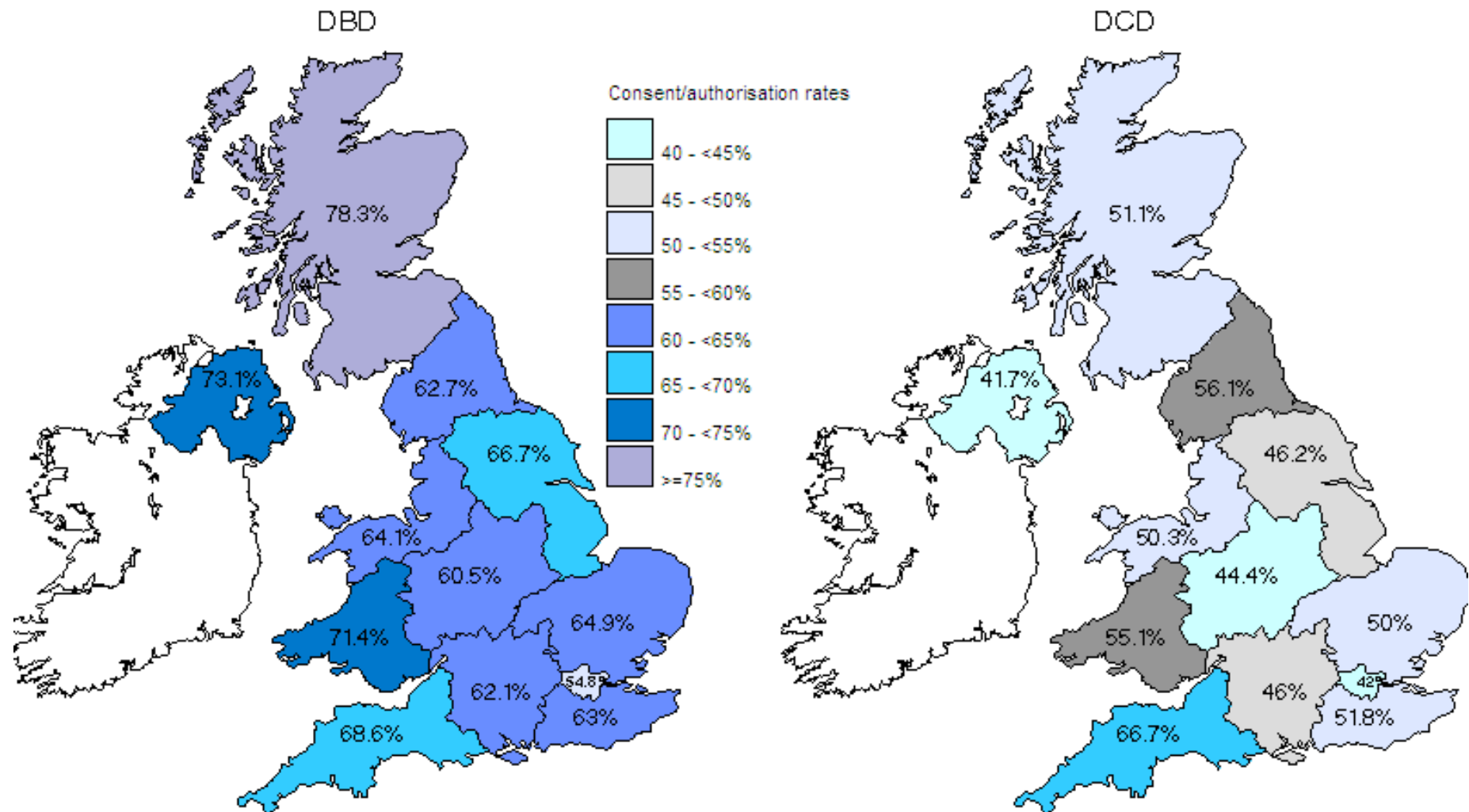


* DBD - Possible donors meeting criteria for neurological testing

DCD - Possible donors not confirmed dead by neurological criteria where imminent death anticipated and treatment withdrawn

The annotated percentages represent the percentage of remaining patients that are lost at each stage, not the percentage of all possible donors

Consent/authorisation rates by Organ Donation Services Team, 1 April 2010 – 31 March 2011



Source: Transplant activity in the UK, 2011-2012, NHS Blood and Transplant

Solutions

Elements of high performing donation systems

- System-wide donor coordinators & donation physicians
- Medical record review to identify missed donation opportunities
- On line intent-to-donate registries, legal authorization to proceed with donation
- Mandatory referral to ODOs (standardized clinical triggers)
- Implementation of leading practices
- Professional education
- Timely performance data, data transparency
- ICU/hospital capacity
- ODO funding
- National coordinating authority



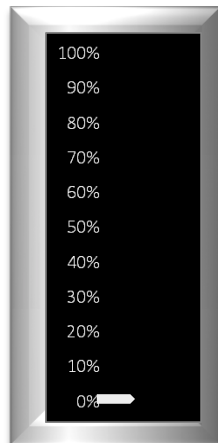
PROVINCE X

DECEASED DONATION PERFORMANCE– For Illustrative Purposes Only

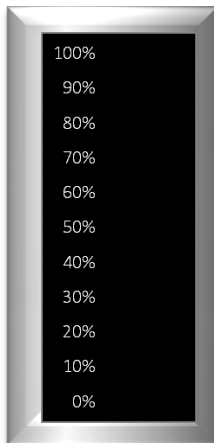
Overall Program Efficacy



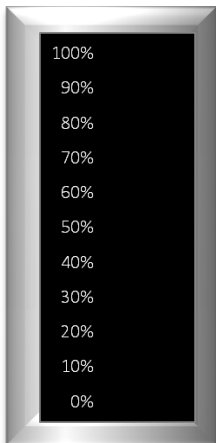
Leading practice uptake



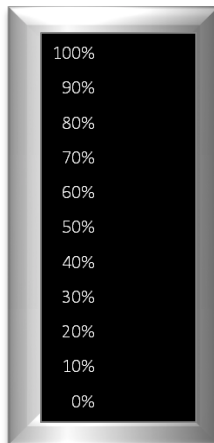
DCD Program



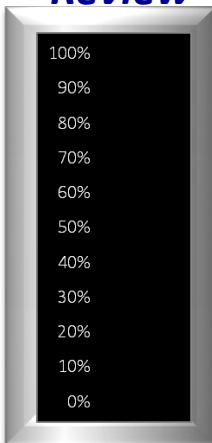
ICU Capacity



Dedicated Personnel



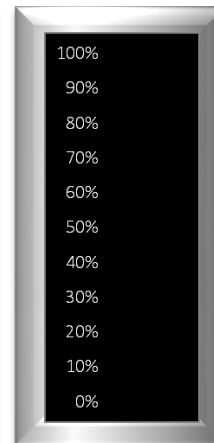
Medical Record Review



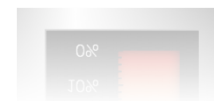
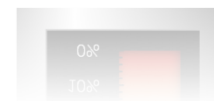
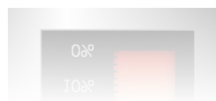
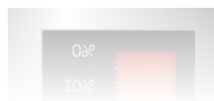
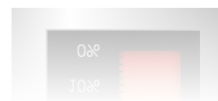
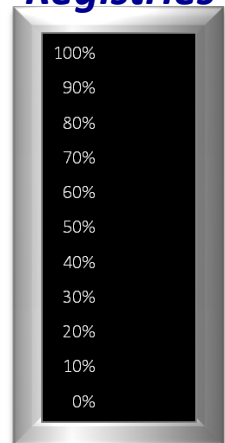
ODO Funding



Data Transparency



Intent to Donate Registries



Components of high donation performance

Early draft, not validated

	BC	AB (N/S)	SK	MB	ON	QC	NB	NS	NL
On-line Intent-to-Donate (% pop)	● (20%)	● (5%)	●	● (1%)	● (27%)	● (25%)	●	● (55%)	●
Mandatory Referral	●	●	●	●	●	●	●	●	●
Donation Physicians	●	●	●	●	●	●	●	●	●
NDD Leading Practices	●	●	●	●	●	●	●	●	●
DCD Programs (% DCD donors)	● (23%)	●/● (17%/0%)	● (0%)	● (0%)	● (29%)	● (12%)	● (0%)	● (29%)	● (0%)
Hospital Death Audits	●	●	●	●	●	●	●	●	●
Trained Requestors	●	●	●	●	●	●	●	●	●
Donor Management LP	●	●	●	●	●	●	●	●	●
DD PMP 2014	14.9	13.8	9.8	5.5	19.4	18.7	9.3	18.0	15.2
2010-2014 (mean DPMP, % change)	13.6 +36%	11 +56%	9.3 -31%	9.3 -65%	17.3 +28%	17.2 +25%	9.5 -12%	20 -11%	17.1 +58%

Why Are Donation Rates in Canada Changing?

- 1. Gradual, incremental & sustained improvement in deceased donation and transplantation rates in Canada**
- 2. Elements of donation performance are better understood**
- 3. Ongoing investment is required in deceased donation services:**
 - ODO**
 - DCD**
 - Donation-focused personnel**
 - Professional education**
 - Infrastructure**

With appreciation and thanks

Collaborators

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Canadian Blood Services

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END